NORTH CAROLINA MEDICAL JOURNAL

OWNED AND PUBLISHED BY

THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

VOLUME 12 DECEMBER, 1951 NUMBER 12

PUBLIC HEALTH ASPECTS OF CIVIL DEFENSE

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Civil defense affects the public health program of the state more by a change in the relative importance of the various existing responsibilities than by a change in the basic nature of those responsibilities. War—which requires us to undertake the unpleasant task of civil defense planning — is a movement of humanity back toward its primitive state. Accordingly, public health preparations for the mass destruction of present-day warfare must be considered primarily in terms of comparatively primitive public health needs, such as the prevention of epidemics and the avoidance of lowering food and shelter resources below subsistence levels.

The State Board of Health is working closely with the Medical Society's Committee on Emergency Medical Service, and has assumed the responsibility for preparing the following plans:

Communicable Disease Control
Sanitation
Nutrition
Registration
Mortuary Service.

In addition to these functions, certain public health personnel and facilities can be made available as part of the radiological defense service, which will probably be established as a separate part of the Health and Medical Service organization.

Communicable Disease Control

Preparations for communicable disease control include three major activities: (1) the immunization with selected antigens of appropriate segments of the population; (2) the reduction of reservoirs of infection to as low a level as possible; (3) observation for and prompt reporting of any unusual change in the pattern of communicable diseases.

Immunization

A nationwide immunization policy for civil defense purposes has not yet been prepared. The production of the necessary biologic products must be taken into account in any such plan, and, for this reason, it is probably advisable not to begin mass immunization of new, large population groups until production facilities have been correlated with proposed needs.

For the present time, current public health practice in other states indicates that mass immunization should be confined to infancy and childhood, and should include diphtheria, pertussis, smallpox, and tetanus. There is now rather general acceptance of the principle of using combined antigens for diphtheria, pertussis, and tetanus before the age of 6 months[1]. The use of a combined antigen offers a great advantage in its simplicity, especially since the same antigen may be used for booster doses and its administration before the age of 6 months offers at least partial protection against pertussis at the time when this disease is most dangerous. Small infants are also seen more frequently by physicians in their offices and in well-baby clinics than are older children, so that a larger percentage of the child population can be reached.

A practical immunization schedule, incor-

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porating the four immunizing agents previously mentioned, is as follows:

Two months: First injection of diphtheria and tetanus toxoids combined with pertussis vaccine
Three months: Second injection of the triple antigen
Four months: Third injection of the triple antigen
Five months: Smallpox vaccination
Six months: Inspection of smallpox vaccination for take and revaccination if necessary
Twelve months: Booster injection of triple antigen
Six years: Booster injection of triple antigen and revaccination against smallpox.

Immunization of children according to this or an equivalent plan should proceed as rapidly as possible, and should be considered an urgent part of the civil defense program. Inclusion of tetanus in the childhood immunization program in those areas where this has not been the case heretofore is recommended, not only as a peacetime procedure, but also as an advance precaution should tetanus immunization of the entire population be recommended nationally for civil defense purposes.

An increase in emphasis on typhoid fever immunization is not being made by the states at this time. Because of the necessity of repeated annual booster doses, it would appear to be more practical to postpone any increase in mass typhoid immunization until such time as civilian war damage is expected within a period of months. In the meantime, typhoid fever immunization of selected population groups in rural areas where the disease still persists, and of individuals who request it, could be continued as at present. It is recommended that where local health departments conduct field immunization clinics, these plan to provide all routine immunizations rather than that for typhoid fever alone.

The present occasion offers an ideal opportunity for private physicians and public health personnel to promote childhood immunization as a measure essential both in peacetime and as a part of civil defense. The North Carolina diphtheria rate in 1949 was 13.7 cases per 100,000 population as compared to 5.4, or less than half, for the United States as a whole. This discrepancy must be corrected.

Reservoirs of infection

The venereal diseases and tuberculosis are the most important of those infections that continue to spread from a large reservoir of undetected cases. In 1950 there were reported in North Carolina 1,187 cases of primary and secondary syphilis and 3,653 cases of tuberculosis. Our present programs for the control of these diseases must continue to operate at as high a level of efficiency as possible.

In regard to syphilis control, the private practitioners of the state are in a strategic position at this particular time. With greatly simplified treatment methods, it can be safely assumed that a higher percentage of patients will seek private medical care than formerly. Prompt reporting of these cases by physicians and the establishment of a plan for the interview of appropriate indivi[illegible]duals so that their contacts can be obtained and investigated, will add greatly to the effectiveness of the present control program.

An excellent example of the possibilities of interviewing private syphilis patients was recently demonstrated[2]. A physician arranged to have one of his private patients interviewed by a trained interviewer on the local health department staff. The names of five persons who were found to have syphilis and, in some instances, other venereal infections, were procured. Interviews with these individuals produced the names of 8 persons infected with syphilis and of one infected with chancroid. One of these patients had a second venereal disease and another had two additional infections. Contact interviews and investigations produced 6 more cases of syphilis and mixed venereal infections in this group. The entire series of interviews and contact investigations revealed the following previously unknown infections: 2 cases of primary syphilis, 5 of secondary syphilis, 6 of early latent syphilis, 4 of chancroid, 4 of lymphogranuloma venereum, and 3 of gonorrhea.

If this same type of interviewing and investigation could be arranged by all private physicians with their local health departments, the venereal disease reservoir could be depleted very rapidly, thereby providing the only sound protection against extensive recurrence of venereal diseases in wartime and during the preceding period of mobilization.

The tuberculosis control program of the

Table 1

Comparison of White and Negro Tuberculosis* Mortality and Morbidity Rates North Carolina 1947-49

Morbidity Rates

Year	White Rate Per 100,000 Population	Negro Rate Per 100,000 Population	Negro Excess Over White (Percent.)
1947	80.4	137.4	70.9
1948	71.0	124.4	75.2
1949	75.0	120.7	60.9

Mortality Rates

Year	White Rate Per 100,000 Population	Negro Rate Per 100,000 Population	Negro Excess Over White (Percent.)
1947	15.4	61.1	296.8
1948	13.0	51.4	295.4
1949	13.6	52.8	288.2

*All forms.

state is already reaching the maximum limits possible with the facilities available. This effort must be fully maintained. Apparently, the only major possibility for increasing efficiency lies in a more restricted selection of population groups for mass x-ray services. It is surprising to note that in mass surveys carried out in nine representative eastern and western counties and two cities in 1949, in which 165,636 miniature x-ray films were taken, the percentage of Negro films found to be positive was slightly lower than the percentage of positive white films, in spite of the fact that the Negro tuberculosis morbidity, based on reported cases, in recent years has been approximately 70 per cent higher than the white rate (table 1). This seems to indicate that many individuals with suspicious symptoms are not presenting themselves voluntarily for mass survey examination.

In this same connection, it is worth mentioning that in the 15,338 persons x-rayed in 1950 by the mass survey unit on loan to Duke Hospital, there were discovered 9.9 cases of moderately and far advanced tuberculosis per 1000 persons examined. This is almost five times as high as the rate of 2.1 moderately and far advanced cases found among 1000 persons examined in 160,133 non-hospital mass surveys in 1950. Further study of the possibility of increasing hospital surveys as a means of raising the detection rate is definitely indicated.

Ideally, we should greatly increase the tuberculosis control effort for civil defense purposes at once, with complete eradication within a definite period of time as the goal. We have the technical knowledge to make this possible. Such an effort would be costly, but should serious disruption of housing and nutritional standards occur, the dividends that would be derived from avoiding a rapid rise in the incidence of tuberculosis would more than justify the original investment.

Changes in communicable disease patterns

Observation for unusual patterns in the incidence of communicable disease is a basic essential in the prevention of widespread outbreaks of naturally occurring diseases and in the early detection of possible attempts at biologic warfare. Among those diseases which at present are not endemic in this state but which could be introduced and spread by existing natural vectors are bubonic plague, various types of arthropod-borne encephalitis, and yellow fever. Air travel makes possible the arrival in this state at any time of persons in the incubation stage of infection from areas where these diseases exist. In recent months we have also been faced with the problem of the commercial importation of rabbits from western states where plague has been demonstrated.

Federal quarantine measures are, of course, in effect, but these cannot be considered to be fully effective at any time, and are subject to repeated breaks during military emergencies.

In regard to agents of biologic warfare, there is no general agreement in published statements[3]. The practical possibilities of this type of attack are limited to airborne infection and contamination of common vehicles such as food and water. There is little likelihood that a self-propagating epidemic would be initiated by these or other means. Accordingly, the problem resolves itself into the prompt detection of this type of enemy action, so that prompt countermeasures can be taken.

Accidental laboratory infections have demonstrated the possibility of air transmission of brucellosis, tularemia, Q fever, Rocky Mountain spotted fever, psittacosis, yellow fever, certain of the encephalitides, coccidioidomycosis, and others. Infections borne by water or food include the well known intestinal infections and, possibly, chemicals or biologic toxins.

One aspect of civil defense against biologic warfare is the avoidance of undue alarm in the public mind. This weapon is probably more potent from the psychologic standpoint than any other and, from information that has been made available, is

certainly less important than other forms of warfare.

It is important, therefore, primarily as a protection against natural hazards, and secondarily as a sensible wartime precaution, that all physicians report the presently reportable diseases promptly and also any unusual incidence of other diseases. Investigation of school and industrial absenteeism, as well as hospital admissions, by local health officers, industrial physicians, and private practitioners will help in the early detection of widespread illness. This can probably be done best by delegating certain responsibilities to school, industrial, and hospital personnel, who have been properly instructed as to what information is needed.

On January 1, 1951, the United States Public Health Service put into operation an epidemic reporting service. All states have agreed to participate. Information regarding the increase in the incidence of disease is requested. This reporting program depends entirely upon the efforts of local health departments and private physicians. Local health departments in North Carolina were notified by the State Board of Health of the epidemic reporting service at the time of its inauguration. The attention of health departments and physicians is herewith again called to this important matter.

Sanitation

Civil defense plans relating to sanitation include water supply, sewage disposal, garbage and refuse disposal, milk and food supplies, insect and rodent control, and housing.

Water supply

Maintenance of a safe water supply in areas of war damage is complicated at best, and is made even more so by the enormously increased water requirements for fire-fighting. Damage to water systems or the emergency use of untreated sources will create many critical problems. Procedures must be developed for making extensive emergency repairs, disinfecting mains, restoring interrupted services, and providing temporary supplies. This can be done by training local water plant operators, sanitary engineers, and others responsible for this work. Emergency auxiliary personnel should be designated and trained. The establishment of a state inventory of disinfecting equipment, important valves, motors, pumps, and piping will facilitate repairs.

During an emergency the local medical authorities should watch closely the status of the water supply so that proper instructions can be relayed to the public.

Sewage and waste disposal

The proper disposal of sewage and industrial waste is necessary at all times. In damaged areas this problem becomes increasingly important, since the interruption of water service would render flush toilets useless and would require the use of primitive methods of excreta disposal. In addition, the disruption of the processing of industrial waste and of the operation of domestic sewage plants would seriously impair the quality of the raw water available to municipalities. The health hazards associated with such problems are so important that careful supervision by health department personnel will be essential.

Plans for emergency sewage disposal facilities should include provisions for emergency pit or can privies on vacant properties, excrement bags for apartment houses and hotels, privies over man-holes in main sewer lines, pumping units furnishing water to plumbing systems of apartment houses, hotels, and residences to remove waste remaining in flush toilets, and the location of equipment that can be borrowed for use in municipal sewage treatment plants.

Garbage and refuse disposal would be one of the first municipal services to be affected in an emergency. The urgency for resumption of such service immediately will not be great except at evacuation centers, hospitals, and mass feeding stations. Sanitary land fills would constitute the most logical solution to this problem.

Milk supply

Public health responsibility for maintaining a safe milk supply include the following: (1) redirecting raw milk supplies from disaster areas to undamaged processing plants; (2) assisting in the repair of partially damaged pasteurizing plants; (3) training of auxiliary milk sanitation personnel and key personnel in processing plants; (4) public notification of the status of the milk supply and precautions to be taken; (5) development of emergency standards covering milk production and processing.

Food

Food sanitation must be considered in the planning of mass feeding facilities, in

the continued operation of existing public eating places under emergency conditions, and in the protection of home food supplies when power failures and other circumstances make adequate refrigeration and cooking difficult or impossible. As in the protection of water and milk supplies, instructions issued directly to the public may constitute one of the most practical means of handling the problem.

Insect and rodent control under disaster conditions is an extremely important problem, not only because of the danger of spreading disease, but because of the destruction of badly needed food and other supplies. Chief reliance would have to be placed on the use of insecticides and rodenticides for immediate results, followed up by the elimination of breeding areas as physical facilities permitted. A state inventory of supplies will be made so that, if necessary, some arrangements can be worked out for storage of minimal quantities.

Housing

In the establishment of emergency housing facilities by other units of the civil defense organization, the public health unit would be expected to establish and enforce minimal standards where possible, in order to reduce overcrowding and to provide water supplies and waste disposal facilities.

Nutrition

Responsibilities with regard to nutrition in the civil defense program require action now. The nutritional status of the population should be brought to a high level as soon as possible and maintained.

Studies of the dietary practices of North Carolina school children conducted by the Nutrition Section of the State Board of Health, indicate that some of the poor food customs of past generations still persist in a large part of the population. The result is a nutritional state characterized by reduced physical and mental efficiency and reduced resistance to disease. Such conditions are a definite liability to the defense effort of the nation.

It is necessary that every person be prepared as well as possible in advance of an emergency to withstand periods of deprivation of essential nutrients.

The first objective of the civil defense nutrition program, therefore, is to expand in every way possible current programs for the education of the public regarding good nutritional practices. Rising prices make it even more important for families to know how to select foods of high nutritive value as economically as possible.

Preparation for an emergency requires the coordination of various agencies and units of the civil defense organization. As part of the allotment of emergency food supplies, the nutritional requirements of each particular population group will have to be considered in order to conserve various items and to guarantee that others meet minimal standards. This requires the establishment of minimum dietary standards for infants, children, adults, laborers, elderly people, and those who are ill. Special attention should continue to be given to prenatal and infant nutrition.

Instructions should be made available early to persons with diabetes and others needing special diets, who may find it necessary to modify their customary diets temporarily.

Plans need to be made with state and county hospitals and other institutions in regard to the kind and amounts of food supplies to be kept on hand to feed the resident population and some additional persons. These plans should include procedures to be followed and the types of menus to be used in the event of power failures and water shortages. Plans are being made for continuing present nutrition programs and for developing all aspects of the work which will provide an efficient nutrition service during emergency periods.

Registration

The question of registering the entire population is still in the discussion stage. Theoretically, many advantages would be derived during active warfare within the country. The program would be expensive and time-consuming, however, and it is not foreseen as an immediate activity.

Objectives of complete registration are as follows: (1) to issue identification cards or tags for use in handling casualties; (2) to control population movements for evacuation and prevent enemy infiltration and sabotage; (3) to permit the drafting of selected segments of the population for industrial purposes or civil defense assignments; (4) to ration food and clothing; (5)

to supply information to families and for emergency welfare purposes.

Existing proposals call for correlation of this type of registration with existing vital statistics operations, in order to clear deaths, add births and process changes of name following marriage or divorce, and to insure coordination with other health service record-keeping, such as immunization and blood typing, should these two activities be instituted on a mass scale.

Mortuary Service

Several functions are combined in this particular activity—namely, confirmation of the fact of death, identification of bodies, embalming, burial, recording of data, notification of relatives, and disposal of property. Not all of these activities would be carried out by the public health organization, but the latter would have the responsibility for the general coordination and administrative direction of the over-all program.

A physician should be available to the morgues, except under the most extreme conditions, in order to confirm the fact of death in those instances where casualties are brought directly from a disaster area rather than from a casualty station. Preferably, clearance should be made through a casualty station in all cases except those involving obviously fatal mutilation. Identification tags initiated at the casualty station should show the area where the body was found, other identifying data, and the medical certification of death. Information from these tags should be recorded at the morgue and the tag left attached to the body permanently. Data regarding place of burial or other disposition should, of course, be entered in the morgue records.

Where families were able to take charge, bodies would be removed to private mortuaries for embalming, so far as possible; otherwise, public burial would follow.

Disposal of property would be a police and welfare function, with proper entries in the morgue records.

Casualty figures would have to be compiled and forwarded to the civil defense director.

There are no unfamiliar problems involved in the handling of deaths from communicable disease, chemical poisonings, or fatal radiation exposures, as regards protection of the mortuary and other personnel, although these matters would require careful attention.

Conclusions

No fundamental change in the existing public health organization is required for civil defense purposes. Local health departments are expected to function as part of the local medical and health service responsible to the local and state civil defense organization. The staff of the State Board of Health will coordinate public health civil defense activities through its representation in the medical and health service operating under the state director of civil defense. Cooperation of many agencies will be necessary to complete the preparation of plans and conduct actual operations. It is necessary that other units be kept informed as to the public health plans, and that proper coordination with those units be worked out.

Certain aspects of the program—such as immunization, nutrition education, preparation of inventories of sanitation equipment and supplies—can be started immediately if they have not already begun. Other operations will consist of training personnel and, if needed, may include the adding of auxiliary volunteers to existing staffs to work part time on special projects.

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Discussion

Dr. M. B. Bethel (Charlotte): One subject that I believe was not discussed is the fact that we in public health work are not lining up for enough mutual aid. Suppose there is an atomic bomb disaster in Durham, for instance, or Charlotte, or any other city or community in the state: there would not be many resources to draw on there, and that city would have to rely on aid from its neighbors.

We have taken the precaution in Charlotte to ask the state health officer to come in and take charge of public health procedure in the event of casualties. It would be well indeed to line up sanitation aid particularly, and all the nurses that could be spared from all over the state to go into the casualty areas.

Briefly mentioned by Dr. Stevick, too, is the possibility of biologic warfare. Although military strategists might say that there won't be many bombs wasted on North Carolina — a predominantly and preponderantly rural population — military damage and sabotage could very well be carried out by means of biologic warfare.

CARDIAC ARREST DURING ANESTHESIA AND SURGICAL OPERATIONS

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Cardiac arrest during the progress of a surgical operation under anesthesia is the most dramatic of all the emergencies with which the surgeon and the anesthetist have to deal. This terrifying accident can occur regardless of the stage of anesthesia, the agent being used, or the type of surgery. A survey of the literature discloses that cardiac arrest, while infrequent, is by no means rare. It is apparently becoming more prevalent, and it is being recognized more promptly and treated more successfully, despite the fact that more operations are being performed on the aged and on patients with diseased hearts.

This is an emergency which requires prompt decision and radical treatment, planned in advance, with full knowledge of the short time available in which to bring about a successful outcome. The average surgeon can effect resumption of cardiac contractions in these cases, provided he is alert to the implications of the situation and psychologically prepared to act promptly and boldly. Wolff[1] points out that nowhere is the phrase, "he who hesitates is lost," so apt. Cardiac arrest requires intermittent manual compression, commonly though inaccurately referred to as massaging the heart.

The Value of Heart Massage and Artificial Circulation

Heart massage, according to Gunn[2] and others, favors resuscitation: (1) by emptying mechanically the distended cardiac chambers; (2) by creating an artificial circulation; (3) by keeping up the nutrition of the myocardium through the coronary vessels; (4) by manually pumping blood into the arteries and so maintaining the circulation of the medulla and other extremely vulnerable portions of the central nervous system; and (5) by stimulating the nervous energy of the cardiac muscle.

Physiologists have put great emphasis on the value of artificial circulation. Gunn injected a dye in a peripheral vein and detected it in a peripheral artery after a few compressions of an arrested heart. He concluded that the difficulty is not so much in starting the heart to beating, as in starting it to beating before stoppage of the circulation to the cortical cells renders these cells incapable of recovery. Gunn also concluded that the time limit for revival of the cortical cells can be calculated, not from the start of spontaneous heart beats, but from the time of beginning massage, pointing out the fundamental importance of artificial circulation and making the outlook on the whole question of resuscitation more hopeful. Zezas[3] attributes to the artificial circulation the success of heart massage.

Massage, as a practical means of treatment in cases of failure of the pulse and respiration, especially those failures occurring during general anesthesia, is based not only upon a series of experiments in physiological laboratories, but upon clinical evidence as well. This extraordinary power of the heart to regain its function after apparent death is well known to the laboratory worker in the field of heart massage.

Early Experimentation

Experiments in this field were made by Schiff[4] as early as 1874. He administered chloroform by inhalation to a number of dogs until the heart ceased to beat, then undertook by artificial respiration and electrical stimulation to restore the cardiac contractions. These measures failed, but massage directly applied restored cardiac action after an interval of 11½ minutes. Tuffier and Hallion[5] communicated a similar series confirming this work.

In 1900 Prus[6] published the results of experiments performed by him on 100 dogs killed by electricity, by suffocation, and by the administration of chloroform. Heart massage and artificial respiration was started in periods varying from 55 seconds to one hour. Of the dogs in which the heart was arrested by electricity, massage was successful in 14 per cent; while of the others, over 75 per cent were resuscitated. Prus[6] concluded that life can be restored even after the heart has ceased to beat for one hour.

Provost and Balleti, from results of animal experimentation, concluded that fibrillary twitchings of the heart muscle are the greatest bar to successful massage, and showed that the longer the lapse of time between the stoppage of the heart and the be-

Read before the Section on Surgery, Medical Society of the State of North Carolina, Pinehurst, May 9, 1951.

ginning of the massage, the greater the probability that these twitchings will appear.

White[7], in 1909, was unable to restore either respiration or circulation by artificial respiration alone, even by inflating the lungs with a bellows after the heart had ceased to beat.

Crile and Dolley[8] pointed out the fact that artificial respiration and cardiac massage should be carried out simultaneously.

The first report of massage of the human heart was made in 1898; the first successful case was reported as late as 1902 by Starling and Lane[9].

Etiology

The cause, or causes, of sudden cardiac arrest may be difficult to determine. A number of factors have been charged with precipitating this emergency. The action of anesthetics like cyclopropane, chloroform, and ethyl chloride in sensitizing the heart to epinephrine is generally known. It is an established principle in physiology that hypoxia will sensitize the heart and cause an increase of epinephrine in the blood stream. Excitement also increases the amount of this agent in the circulation. Lee and Downs[10] have discussed the effect of hypoxia in producing a hypersensitive carotid sinus reaction, causing inhibition of cardiac activity.

Stimulation of the vagus nerve may inhibit cardiac activity. Abnormal sensitivity to a drug may be the cause, as when sudden cardiac arrest occurs under spinal anesthesia. When a spinal anesthetic extends upwards far enough to paralyze thoracic nerves, breathing is then limited to diaphragmatic contractions; and when the fourth cervical roots are paralyzed, diaphragmatic action ceases. Too deep anesthesia and many other factors may play a part in failure of respiration and in cardiac arrest.

Respiration and Circulation

Thompson and his co-workers[11] have shown that in a case of heart arrest some cerebral circulation can be effected solely by artificially ventilating the lungs; whether the circulation thus produced is enough to keep the cortical cells alive is open to question. When heart massage is combined with artificial respiration or aeration of the lungs, however, a condition is created which may offer a surgeon an hour or even longer in which to effect resuscitation. This is supported by a number of reported cases.

Wolff points out that unquestionably normal activity can be restored after an interval of heart arrest much longer than that over which the central nervous system can withstand anoxia.

The length of time that the central nervous system can be completely deprived of oxygen and still completely recover has never been determined. The highest centers are first damaged, and disintegration proceeds downward as the period of hypoxia is prolonged. The most commonly stated figures, based on experimental and clinical evidence, vary rather widely—from two to seven minutes. In several clinical reports, complete recovery was said to have taken place after 10 to 15 minutes of cardiac arrest. The general opinion of the workers in this field is that, in the excitement, there was either some error in the estimated time, or absolute circulatory arrest was not present throughout the entire period. The duration of cardiac arrest, as logically held by Barber and Madden[12], and others, should be regarded as the "interval between the cessation of the heart beat and the performance of manual cardiac massage", and not until the "restoration of a normal spontaneous cardiac rhythm.".

Fisher and Gunn[13] advise boldness of procedure if the heart has been stopped three or four minutes, stating that the patient is thereby subjected to no additional risk. Russell judges from experiments, clinical experience, and reports of recoveries after massage that "we are probably safe in assuming that about five minutes loss of circulation is the outside limit that the human brain can withstand and recover completely."

Norbury[14] has advocated massage after giving other methods a trial of only two minutes, since he thinks that artificial respiration can be of no use in the absence of circulation.

Weinberger and Gibbon[15] have demonstrated experimentally that massage must begin within three and one-half minutes. They showed that interruption of the circulation to the brain for three and one-half minutes or longer resulted in permanent changes in psychic behavior.

Beck and Rand[16] believe that the supply of oxygen to the brain must be re-established within three to five minutes. They also state

that restoration of the heart beat is neither difficult nor urgent, so long as the lungs are being well inflated and deflated, and the emptying of the heart by hand is kept up. As long as these two procedures are carried out, the patient is protected and time is not a factor of the first importance. The experience of these observers indicates that the heart beat can be restored in every heart not seriously diseased before the beginning of the operation, provided that oxygen is supplied and the heart is properly massaged.

Treatment

As soon as cardiac arrest has been determined by the absence of pulsation in large vessels and of registrable blood pressure, a predetermined plan of action must be instituted at once. As suggested by Lahey and Ruzicka[17], a needle not attached to a syringe should be introduced into the heart. Any oscillation of the needle will show the heart to be beating, and in rare instances the insertion of the needle will provide the stimulus to start cardiac action again. Artificial respiration with 100 per cent oxygen should be instituted without delay and kept up continuously, using an anesthetic machine or a simple oxygen tank with a breathing bag and a tight-fitting mask. An endotracheal tube should be inserted whenever available.

Drugs

The general opinion is that drugs are of little, if any, benefit in resuscitating the heart. Epinephrine by intracardiac injection is first thought of and most frequently used. It is believed that this drug, in some instances at least, may be more harmful than beneficial, as it may produce ventricular fibrillation unless used in small doses. Lahey and others hold that a small dose of epinephrine, ½ cc. of a 1:1000 dilution, should be injected into the heart; and that 5 cc. of a 1 per cent solution of procaine hydrochloride should be combined with the epinephrine or given as a separate injection. This dose is not to be repeated. A part of the solution may be applied to the surface of the heart when the arrest occurs.

Methods of instituting massage

If heart failure occurs when an operation is in progress, one can feel for pulsation in the large vessels, and if none is felt massage should be started at once. This problem, simplest during open thoracotomy, is more difficult during an abdominal operation, although in the latter subdiaphragmatic compression may be made at once. This procedure is rarely effective, however, as only the apex of the heart can be reached and lightly compressed against the anterior chest wall, and this is insufficient for emptying the distended cardiac chambers. This method should be dispensed with after a few seconds if there is no response, and the diaphragm should be incised by extending the incision high in the epigastrium, or, if necessary, by making an additional incision. The left lobe of the liver is retracted downward and backward, and the incision in the diaphragm is made anteroposteriorly; the hand is then plunged through and direct massage given.

If neither of the two body cavities is open at the time of failure, the problem is much more complex and the percentage of success is much lowered by the delay in beginning effective massage. This applies to operations on the nose and throat, dilatation and curettage, hemorrhoidectomy, fracture reduction, and so forth.

When heart failure occurs when an abdominal or thoracic operation is not in progress, Johnson and Kirby[18] state that the surgeon should be prepared to open the chest with the greatest dispatch, having thought out the quickest and easiest method for use. They insist that the surgeon needs no tools other than gloves and a scalpel. Given these, he should have his hand on the heart in 10 to 15 seconds. Skin antiseptics and sterile drapes are refinements to be utilized when available, but their lack should not be allowed to cost the patient his life.

The incision should be made in the left fourth interspace, from about the edge of the sternum to the posterior axillary line. Since there the bleeding is negligible, the incision can be carried quickly through the chest wall and pleura. The surgeon can then readily put one hand between the fourth and fifth ribs, grasp the heart, and start compressing it rhythmically.

It occurs to me, however, that the general surgeon who is not accustomed to thoracotomy, but is familiar with abdominal surgery, could make a transperitoneal approach through an upper median incision and try subdiaphragmatic massage for a few seconds. If this maneuver proves unsuccessful, he should then depress the left lobe of the liver and incise the diaphragm anteroposteriorly, and have the heart in his hand in a shorter time. This simple technique could

Table 1

Review of 178 Reported Cases of Heart Failure Subjected to Heart Massage (1896-1950 Inclusive)

Collected by	*No. Cases*	*Hearts not Resuscitated*	*Hearts Resuscitated*	*Partial Success*	*Recovered*
Bost 1896-1923	75	36 (48%)	39 (52%)	23 (30%)	16 (21%)
Lee & Downs 1923-1924	24	not reported	not reported	not reported	9 (37%)
Barber & Madden 1924-1945	44	5 (9%)	39 (88%)	16 (36%)	23 (52%)
Bost 1946-1950	35	1 (3%)	34 (97%)	13 (37%)	21 (60%)
Total	178	?	?	?	69 (38%)

Note percentage of improvement from the earliest report (1896) to the latest (1950) inclusive. Reading downward: Hearts not resuscitated 48%, 9%, and 3%; hearts resuscitated 52%, 88%, and 97%; partial success 30%, 36%, and 37%; recovered 21%, 37%, 52%, and 60%.

easily be practiced on a body coming to autopsy. Whatever method is chosen, the surgeon should have a definite plan that can be executed with dispatch.

Rate, technique, and duration of massage

The rate of massage has generally been held to be half the normal heart rate, 30 to 40 compressions per minute, so as to allow ample time for the heart to fill with blood after each compression. Dumke and Schmidt[19] have recently shown in dogs, by means of a meter attached to the thoracic aorta, that a greater blood flow was produced when the heart was compressed at a rapid rate, 60 to 120 times per minute. In all instances the blood flow increased, regardless of whether the heart felt full or empty. As the result of these experiments, these investigators became convinced that one should compress the heart as rapidly as possible, up to 120 times per minute. The fatigue of the operator makes a rate of 120 times per minute impossible for more than a few minutes, whereas he can continue for a long time at 60 to 80 squeezes per minute. If there are two or more operators who can take turns, a faster rate may be constantly maintained.

In the laboratory it was found that some practice was required to produce an effective blood flow by cardiac massage. Dumke and Schmidt[19] found that the dog's heart could be compressed most effectively by placing the thumb in front and the fingers behind or the thumb and index finger in front and the other three fingers behind. They also found out that the blood flow produced by compressing the heart against the anterior wall was only one-half as great as that produced by the preceding method. Only one-fifth as much flow could be produced by compressing the heart through the diaphragm, with one hand in the abdomen. The amount of blood flow produced by artificial respiration alone was too small to be measurable. They added that any hope for artificial respiration as an effective method of producing blood flow should be abandoned.

The question of how long cardiac massage should be continued has never been answered, but a clue is given in a case reported by Adams and Hand[20], in which cardiac massage was continued for no less than 20 minutes before a response was obtained; yet the patient recovered. The heart usually responds within a few seconds to a few minutes. Reestablishment of respiration, however, is apt to be much slower, and may not be accomplished for 45 minutes or even an hour.

Ventricular Fibrillation

Ventricular fibrillation is reported in the literature to be the most frequent complication of cardiac resuscitation. This complication is thought to be due to anoxia, mechanical trauma, electric shock, and drugs which increase the irritability of the heart. Fibrillation apparently occurs most frequently during operations on the pericardium and heart. When it occurs, it should be treated promptly. Lahey and Ruzicka state that they did not encounter the condition in any of their 15 cases, and thought that this fact might be due to their use of procaine in the initial treatment. Burstein[21] has shown experimentally and clinically that the local and intravenous use of procaine will protect the heart against irregularities resulting from mechanical stimulation. Beck also advises the use of procaine in the heart and its application to the surface of the fibrillating heart. Beck has recently advocated the use of an electric counter-shock method for treatment of ventricular fibrillation.

Table 2
Results of Heart Massage in 48 (5.5 Per Cent) Cases from Blalock's Group of 870 Cases of Pulmonic Stenosis Treated Surgically (Not Included in Table 1)

	No. Cases	Hearts not Resuscitated	Hearts Resuscitated	Partial Success	Recovered
Pulmonic Stenosis Cases	48	15 (31%)	33 (68%)	11 (23%)	12 (25%)

Review of Cases (Tables 1 and 2)

Green[22], in an exhaustive review of the world literature in 1906, was able to collect 40 cases in which manual massage of the heart had been performed. Thirty-six of these had been previously reported. In this series 9 (22 per cent) complete recoveries were obtained, and 8 (20 per cent) partial successes. The latter included those cases in which the pulse and respiration were restored for variable periods of time but ended fatally.

White[7], in 1909, added 10 cases to the 40 reported by Green. In 10 (20 per cent) of these, complete recovery was obtained, and 14 (28 per cent) were partially successful.

I reviewed the literature in 1918[24] and again in 1923[25], and collected 25 more cases —including 2 of my own, both partially successful—making a total of 75 cases in which heart massage was employed. Complete recovery occurred in 16 (23 per cent) of the cases; heart action and respiration were restored in 23 (30 per cent), but the patients died in from one-half hour to three days.

Lee and Downs (1924)[10] added 24 cases to the 75 I had previously collected and reported, including the presentation of a successful case of their own. This made a grand total of 99 cases reported up to this time, with complete recovery in 25 (25 per cent).

Barber and Madden[12], made a comprehensive review of the world literature from 1924 up to 1946, and collected 44 more cases, with complete recoveries in 23 (52 per cent), and partial recoveries in 16 (36 per cent). This brings the total number of cases reported to 143, 48 (33 per cent) of which were completely successful.

I have again reviewed the literature and have collected 34 more cases, adding a recent completely successful case of my own (here reported). Of these 34 cases, complete recovery was achieved in 21 (60 per cent), and partial in 13 (37 per cent). Only one case (2 per cent) was a failure. These 35 cases, from 1946 to 1950 inclusive, added to Barber and Madden's 143 cases, make a grand total of 178 cases, in 69 (38 per cent) of which recovery was complete.

This grand total of 178 cases does not include a special group of cases of pulmonic stenosis reported by Cooley and Blalock[23], including 48 cases in which cardiac massage was done. Of these, 21 (43 per cent) were partially successful and 12 (25 per cent) of the patients recovered (table 2).

It is interesting and gratifying to note the improved results in the 35 cases which have occurred during the last five years. These remarkably improved results are apparently due, not so much to our improved method of resuscitation, as to the surgeon's boldness and promptness in establishing artificial circulation by the early institution of heart massage and artificial respiration with 100 per cent oxygen. A study of resuscitated cases points up the superior results obtained when the chest was already open at the time that the heart ceased to beat, so that massage could be started at once. (Witness the 4 completely successful chest cases reported by Johnson and Kirby.)

In considering the grand total of 178 cases subjected to heart massage since it was first successfully employed 48 years ago, it is reasonable to assume that in a large number of cases, heart massage was employed but not reported, since one clinic (the Lahey) reports an average now of 2 cases a year. With this ratio extending throughout various countries, the total number would be very large indeed.

Another point of interest in this connection is the relatively small number of patients who have had the benefit of heart massage, as compared with the number—probably going into the thousands—reported as having "died on the table" or as an "anesthetic death," who were never given the chance of benefit by heart massage. Nearly every surgeon of broad experience has been confronted with this condition, and, I might add, almost every intern or resident surgeon has seen patients who "went bad under the anesthetic," were given prolonged artificial respiration and stimulation of various kinds, had the benefit of breathing machines in many cases, and other attempts at resusci-

tation — all without avail — until, finally, without the benefit of heart massage, the case ended with the autopsy report.

In many cases heart massage is frequently not thought of until it is too late to effect a recovery, or not thought of at all. Many surgeons with whom I have talked in this and other states, have told me that they have had cases of heart failure, and a number stated that heart massage never occurred to them. Since most hearts can be resuscitated after a reasonable delay, however, the patient should still have whatever chance of benefit there may be from heart massage. Even though the likelihood is that the function of the cortical cells is already too far destroyed to admit full recovery, massage should be done on the chance of a partial success, returning the patient to his room and his people, if to live only a short time, in place of the shocking report, "died on the table."

Author's Cases

Case 1[24]

A 24 year old army private was admitted to Dartford War Hospital in October, 1917, with infected shrapnel wounds which resulted in metastatic infection. The patient had been anesthetized and an incision was about to be made when respiration and pulse ceased. The ordinary methods of resuscitation were employed for 10 minutes, following which subdiaphragmatic massage was done for an additional 10 minutes, with no response. The diaphragm was then incised and direct massage begun, and after only 10 or 12 gentle squeezes heart action was resumed after it had been suspended for 25 minutes. After five minutes more respiration was resumed spontaneously. The patient lived for 78 hours, but did not regain consciousness.

Case 2[25]

A 36 year old mother of one child, aged 6, entered Presbyterian Hospital, Charlotte, May 10, 1921, complaining of pain in the lower portion of the abdomen of five years' duration, and irregular menstrual bleeding for the past year. The lower part of the abdomen was tender, the uterus was hard, nodular and three times the normal size, and a small movable mass could be palpated on the right side. The lungs and heart gave no evidence of disease. Urinalysis was negative. A blood count disclosed 8,500 white cells, 4,500,000 red cells, and a hemoglobin of 85 per cent. The patient appeared to be a good surgical risk.

The operation was performed on May 11, 1921. The usual preliminary dose of 16 mg. (¼ grain) of morphine, and 0.45 mg. (1/150 grain) of atropine, was given. Ether was well received. The uterus with its multiple fibroid tumors, a right ovarian cyst, and the appendix were removed. The operation was concluded and the peritoneum closed in 35 minutes.

Just as the head of the table was elevated from the Trendelenburg position the patient ceased to breathe. The head of the table was at once lowered, and artificial respiration instituted. No pulsation could be felt, and the pupils were dilated and insensitive. Six tenths milligram (1/100 grain) of atropine and 0.2 Gm. (3 grains) of camphor in oil were given. Neither the anesthetist nor the family physician could detect heart sounds by auscultation. Several sharp percussion blows were made over the cardiac area. After a lapse of three minutes the peritoneal sutures were removed and subdiaphragmatic massage done, causing a slight improvement in the patient's color, but no heart beat or attempt at respiration. The extremities were bandaged, and artificial respiration was continued the whole time.

A waxy pallor now made it appear to all doctors and nurses present that the patient's condition was hopeless. After a lapse of six minutes I cut through the epigastrium and the diaphragm, introduced my hand in the chest, and found the heart arrested in systole. I began gently squeezing the heart at 25 or 30 times per minute. After a few seconds the skin resumed a reddish hue, in a half-minute a slight muscular twitch was felt, and then the heart began beating very feebly and slowly. Within a few seconds a radial pulse could be felt, after cardiac action had been suspended for all of seven minutes. Five minutes later spontaneous respiration began, not more than three or four to the minute, but gradually improving. Oxygen and saline were given, and the incision was closed. The patient returned to the room, apparently in good condition—respiration 20, pulse 100, with good volume. In about one-half hour the patient began to return to a semi-conscious condition, opened eyes, attempted to speak, and moved about in bed. Several hours later the pulse began to accelerate, and muscular twitchings developed in the face and extremities; the pulse was very rapid. Morphine and saline again were given, also Digifolin. The heart rate continued to increase, however, and the end came next morning, 14 hours from the time of resuscitation.

Case 3

A 56 year old married woman, the mother of four children, was admitted to Mercy Hospital, March 6, 1948, complaining of a gradually developing jaundice, some general itching, slight pain, and a sensation of mild epigastric pressure. She had always been in good health, and had never had an operation or a serious illness. She had had a slight loss of weight.

The history, physical examination, and accessory clinical findings justified a tentative diagnosis of carcinoma, probably of the pancreas. After transfusions and other supportive measures, operation was performed.

The usual preoperative medication, consisting of 20 mg. (⅓ grain) of Pantopon and 0.45 mg. (1/150 grain) of atropine, was given one-half hour before operation. Spinal anesthetic consisted of 150 mg. of Novocaine injected between the third and fourth lumbar vertebrae. The table was kept flat, and the patient's head was elevated with a pillow.

An upper right mid-rectus incision was made. There was a small amount of bile-stained fluid, and gallbladder was only slightly distended. The head of the pancreas was greatly enlarged, and very hard and nodular; hard, nodular areas were felt along portal vessels and common duct, extending up to the liver, and one nodule high on anterior surface of liver was noted. A specimen removed from pancreas proved to be "adenocarcinoma."

After the operation had been in progress for 30 minutes, as the fundus of the gallbladder was being anastomosed to the pyloric end of the stomach, the anesthetist announced without warning, that the patient had no pulse and that respiration had ceased. There was no pulsation of the abdominal aorta; the heart could be felt through the diaphragm, but no beat detected. Artificial respiration with 100 per cent oxygen was given. Subdiaphragmatic massage was done for one minute, without response. After

an interval of two or three minutes an anteroposterior incision was made in the diaphragm, the right hand passed through into the chest, and the heart grasped. It was arrested in diastole. After three or four compressions had been made, a slight contraction was felt. After several more compressions the heart started to beat very feebly but regularly, gradually increasing in force. The temporal pulse could then be felt and facial expression gradually improved. Stimulants were given and artificial respiration was kept up. Spontaneous breathing returned after an interval of eight to ten minutes. The incised diaphragm was closed, and the anastomosis (cholecystogastrostomy) was then completed and the abdominal incision closed.

The patient left the operating room in fair condition, but in semicoma. In the afternoon her mental condition was good. Pulse and blood pressure were normal.

The postoperative course was uneventful, and she was dismissed from the hospital in two weeks in very good condition. The subsequent course was gradually downward as a result of her carcinoma, and she died three months later.

Comment

Cases 1 and 2 are classed as partial successes. They are fairly typical examples of patients, apparently good risks, who under an anesthetic, for no apparent reason, suddenly stop breathing. The ultimate failure after resuscitation in these 2 cases was due to the irreparable damage done to the cortical cells during the long-suspended circulation. Physiologists agree that three to four minutes of suspended circulation is the limit that the human brain can withstand.

Case 3 is classed as a complete success or recovery, since this death was due to the carcinomatosis. Apparently the heart arrest on the table and the complete resuscitation were in no way connected with the final outcome three months later.

Conclusions

1. Heart massage is a valuable method, soundly based on both physiologic experiments and clinical work, for re-establishing cardiac action which has suddenly failed during anesthesia and surgery.

2. The possibility of resuscitation bears a definite relationship to the lapse of time between the cessation of the heart beat and the institution of massage; the shorter the interval, the more certain the response.

3. If the abdomen is already open, massage should be instituted at once. Otherwise not more than three and one-half minutes should be consumed in attempting resuscitation by ordinary methods. In case it has been impossible to institute massage within this time, the procedure should not be barred.

4. Subdiaphragmatic massage may rarely suffice, especially in children and if undertaken promptly; but if only the apex is reached and the heart remains unresponsive after a few attempts at compression, the diaphragm should be promptly incised and direct massage instituted.

5. No surgeon, even though little experienced in the technique, should be content to abandon a patient without giving him the benefit of direct cardiac massage.

6. The need for a more general use of heart massage is great, as it will revive many patients who would otherwise perish. Recent reports of cases in the period 1945-1950 show 60 per cent recovery and 37 per cent partial recovery.

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Discussion

Dr. William F. Hollister (Southern Pines): Dr. Sparrow and I recently witnessed a demonstration in Dr. Beck's Clinic in Cleveland which brought out a very important factor in cardiac arrest. Often, when the chest has been opened, cardiac massage fails to resuscitate the patient. It is important to know whether the heart stops in systolic arrest or in fibrillation. If it stops in systolic arrest, then massage, in the majority of the cases, will restore

the heart beat to normal rhythm. If the heart stops in fibrillation, it is extremely important that it be converted to systolic arrest before massage is applied. That fact undoubtedly explains the failures in Dr. Bost's chart.

Dr. Beck presented that very dramatically and repeatedly in his laboratory. If a heart is fibrillating—and this was true of the ones we saw—it can not be converted to normal rhythm by massage; if the fibrillation is converted to systolic arrest, then massage can restore the normal rhythm. All surgeons should have some type of caradic stimulator on hand in the operating room.

MALIGNANT ADENOMAS OF THE COLON AND RECTUM

(*Adenoma Malignum*)

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The problem of the proper treatment of non-invasive malignant adenomas of the colon and rectum has been of concern to surgeons and pathologists for many years. With each individual case, a decision between local removal or radical operation must be made. The importance of such a decision is evident; the establishment of a permanent colostomy is undesirable if local excision or fulguration will cure the patient. Yet, the loss of a life subsequent to incomplete removal, recurrence, and metastasis is an even greater tragedy. This study is an attempt to evaluate the treatment of these lesions at The New York Hospital over a period of fifteen years.

Classification of Adenomas

In order to present this subject, the various types of adenomas and their relationship to cancer will be briefly considered. These lesions can be divided on etiologic, pathologic, and clinical features into (1) post - inflammatory, or pseudo - polyps, and (2) true adenomas.

Pseudo-polyps

These polyps develop after certain inflammatory processes, such as tuberculosis, dysentery, severe amebiasis, and most importantly, in chronic ulcerative colitis. Of 1,234 cases of polypoid diseases of all types studied by Buie[1], 110, or 9 per cent, were classified as post - inflammatory. Sloan, Bargen, and Baggenstoss[2] found that of 2,000 cases of chronic ulcerative colitis seen at The Mayo Clinic, 19 per cent developed polyps of the colon or rectum.

The exact relationship between the pseudo-polyps of chronic ulcerative colitis and the development of cancer has not been clarified, despite the fact it has been shown that cancer frequently develops in colons of patients with chronic ulcerative colitis. Five per cent of the 2,000 patients studied by Sloan and others[2] developed neoplastic lesions of the colon and rectum. In following 98 patients with chronic ulcerative colitis over a period of years, Cave[3] has seen carcinoma develop in 10, or 10.2 per cent. It has been pointed out by Wesson and Bargen[4] that the incidence of death from cancer of the large intestine in the general population is only 0.01 per cent, indicating the real danger of malignant degeneration in this disease.

True adenomas

This division includes all the true neoplastic lesions, and may be properly subdivided.

Group A (*intestinal adenomatosis*) is made up of those cases of multiple lesions of the colon which are definitely hereditary, which appear in young individuals, and which almost invariably develop into cancer at an early age if left to run their natural course. Fifty-five, or 4.5 per cent, of Buie's 1,234 cases fall into this classification[1]. Lockhart-Mummery, after careful study of this condition, proposed the term "intestinal adenomatosis," and found evidence that it was a disease transmitted by and attacking both sexes, apparently due to a gene mutation inherited as a Mendelian dominant[5]. It is in this type of polypoid diseases that the tendency toward malignant degeneration is most marked. Of the 29 patients studied by Coffey and Bargen, 62 per cent were found to have cancer[6]. In Bacon's group of 16 cases of intestinal adenomatosis, 62.5 per cent developed malignant tumors[7].

Group B is made up of cases of one or more true adenomas in the colon or rectum. Although sometimes multiple but not so numerous, these are not to be confused with intestinal adenomatosis. One thousand and sixty-five, or 86.5 per cent, of the 1,234 patients with polyps studied by Buie[1] were placed in this group. Strictly speaking, fibromas, lipomas, neuromas, carcinoid tumors, and other lesions fall into this classi-

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fication, but they are insignificant in number when compared to the true adenomas.

Adenomas (group B) of the colon and rectum are not rare. Hellwig found these lesions in 9.5 per cent of 1,460 autopsies[8]; Swinton and Haug in 7 per cent of 1,843 autopsies[9], and Dukes in 9.4 per cent of 127 autopsies[10]. Other authors have given figures ranging from 1.7 per cent to 69 per cent[11]. The higher figure was obtained by examination of the intestine with a hand lens, and it is apparent that variation in the care with which examinations are carried out and the criteria for identifying the lesion as an adenoma account for the difference in reported figures. In the clinical experience of those interested in proctologic diseases, the reported incidence of adenomas found on sigmoidoscopic examination has varied from 1.2 per cent to 5 per cent[12]. These were selected patients, but at the Chicago Cancer Prevention Clinic, in the course of the routine examination, 2 per cent of 1,031 patients were found to have polyps[13].

The Relationship Between Adenoma and Cancer of the Large Intestine

Evidence for a relationship

The incidence of cancer in adenomatous lesions has been studied extensively in both autopsy and surgical material. Helwig found that 7.2 per cent of 139 adenomas in 1,460 autopsies were histologically malignant and that two additional carcinomas, diagnosed only after microscopic examination, apparently arose directly from the mucosa[8]. From this evidence he concluded that the great majority of cancers develop in adenomas, but that some may arise independently. Lawrence found that 3.6 per cent of the colonic adenomas and 16 per cent of the rectal adenomas discovered in 7,000 autopsies were malignant[11c]. In surgical material, the reported incidence of carcinoma in adenomas has varied from 14 per cent to 77 per cent in different studies[11d, 12c, 14].

The age and sex of the patients and the anatomic location of the adenomas had been offered as indirect evidence of the etiologic relationship between benign adenomas and cancer. Brust found the average age of 143 patients with adenomas to be 48, and the average age of patients with cancer to be 57[15]. He reports that the benign and malignant lesions occur in the two sexes in the same 3 to 2 ratio. Helwig found that benign adenomas have a predilection for the same segments of the intestine as do adenomas with malignant transition and unquestionable carcinoma[8]. Swinton and Warren presented similar evidence[16]. Susman, however, was unable to find such a correlation[14c], and Klemperer felt that the striking predilection of carcinoma for the sigmoid and rectum was not shared by adenomas[11d].

Another bit of circumstantial evidence to relate benign adenomas and cancer etiologically has been the frequent association of the two in the same intestine. David states that 25 per cent of colons with carcinoma also harbor adenomas[17], while Dukes found the two associated in 75 per cent of 33 consecutive cases of carcinoma[10], and Helwig in 52 per cent of 25 cases[8]. Similar studies have yielded figures ranging from 4.7 to 57 per cent [4, 7]. This information has, in general, been advanced as suggesting a direct relationship between benign and malignant lesions. Saint, however, believes the association is not very frequent and that, although cancer can undoubtedly arise from malignant changes in adenomas, the majority arise independently[14b].

As direct evidence of the malignant transformation of benign adenomas, a few cases that have been directly observed may be offered. Willis has described the development of carcinomatous change in an adenoma exposed in a colostomy[18]. Manheim and Druckerman correlated the clinical and the histologic features of biopsy specimens from a benign adenoma which developed into a pedunculated adenocarcinoma under observation[19]. Brust found that of 87 patients with solitary adenomas of the rectum who declined treatment, 4 developed carcinoma at the site of the adenoma within five years, three additional lesions increased in size, and one remained the same[15]. Unfortunately, the other 79 patients did not return for examination.

Evidence against a relationship

On the other hand, Colvert and Brown[14d] have presented some evidence against the generally accepted relationship between benign and malignant epithelial lesions of the colon. They compared a group of 43 patients who refused to have adenomas removed with 117 who submitted to removal. In a five to eleven year follow-up period, they found no evidence to support the belief that benign polyps tend to become malignant, and concluded that adenomas are either cancers in

the beginning or tend to become malignant very early.

Material for Study

The lesion in which we are primarily interested is often referred to as adenoma malignum. This is an adenoma which exhibits overgrowing mucosa, and is usually secreting mucus very actively. There may be considerable metaplasia, and when this is noted together with mitotic figures, the appearance of the tumor is indistinguishable from that of cancer. Unless there is definite invasion of the pedicle, such tumors may be removed by local methods and treated as though non-cancerous.

For the purpose of this study, all cases in which the diagnosis of adenoma malignum, malignant polyp, or similar designation was made by histologic examination in the Department of Surgical Pathology at The New York Hospital from 1932 to 1946 were reviewed. The primary pathologic diagnosis was made by Dr. N. Chandler Foot[20], Director of the Department of Surgical Pathology at the time. During this period, adenomas from 564 patients were examined, and 1,547 patients with carcinoma of the colon were admitted to the hospital. In 34 of the 564 adenomas, one of the above diagnoses was made. The fact that only 34 cases were found indicates that the great majority of specimens were diagnosed either as unequivocal carcinoma or as benign adenoma.

Clinical data

The age varied from 29 to 70 years and averaged 56. Seventy per cent of the patients were in the sixth and seventh decade of life. Of the 34 patients, 24, or 70 per cent, were male. Many nationalities, races, and occupations were represented, and these factors do not seem to be significant.

The most frequent symptom was rectal bleeding. Although the bleeding was often attributable to other sources such as hemorrhoids, it did serve to lead to discovery of the adenoma through proctoscopic and roentgen examination. Abdominal cramps or pain, anal discomfort, change in bowel habits, and mucus in the stools were also listed as principal complaints. There is no reliable, typical history for adenoma of the colon. Its discovery depends upon careful and complete examination of all patients with symptoms referable to the lower gastrointestinal tract.

Treatment and Results

A general plan of treatment became established by which conservative measures were reserved for pedunculated adenomas with malignant changes, while radical surgical treatment for sessile malignant adenomas was carried out. The 34 cases have been divided into three groups. The patients in the first group are those with pedunculated adenomas showing malignant change which were treated locally; in the second, those with sessile lesions treated radically; and in the third, those in whom malignant adenomas were associated with carcinoma of the colon.

Group I. Pedunculated adenoma

In 22 cases, the pedunculated lesions were treated by excision or some less radical procedure than is ordinarily performed for cancer. Although the histologic diagnosis in these cases varied from frank carcinoma in an adenoma to metaplastic adenoma, only those which were regarded as very suggestive (and comment to this fact made in the original report) are included in this study. In other words, they represent more dangerous lesions than the common hyperplastic adenomas. After assurance that the biopsy specimen was indeed from a pedunculated lesion, the pathologist usually recommended local removal and close observation. The procedure was carried out by cautery, snare, biopsy forceps, and excision.

Two patients in this first group were not treated. One refused treatment after the diagnosis of malignant adenoma was established by biopsy. Four years later he had developed a large fungating mass, which was diagnosed after biopsy as precancerous adenoma. This patient still refused treatment and died elsewhere of "myocarditis" eight years after the first biopsy. The second untreated patient had intestinal adenomatosis. On five biopsies, the diagnosis of premalignant adenoma was made three times and adenoma malignum twice. Radical treatment was thought contraindicated because of advanced syphilis of the central nervous system. The patient died elsewhere of the latter disease four and a half years later. At that time a report stated that he had no intestinal symptoms and that the rectal examination was negative.

The remaining 20 patients were followed from eighteen months to twelve years, an average of six and a half years. No reason

was found to regret the decision to remove the pedunculated lesion locally in any of these cases. Two patients subsequently developed benign adenomas two and seven years, respectively, after the first procedure. Four died of other diseases, all apparently without further trouble from lesions of the colon or rectum. Autopsy was made in only one case, and no lesion was discovered in the large intestine of this patient, from whom a malignant adenoma had been removed ten years previously.

Group II. Sessile lesions

The second group of 5 cases is made up of patients in whom the diagnosis of malignant adenoma was made from the histopathologic examination of a sessile lesion. The growths were usually large, indurated, fixed, often ulcerated, and bleeding. Further surgical treatment was recommended, and the final diagnosis on the excised specimens of 3 patients was adenocarcinoma. At laparotomy one lesion was found inoperable, owing to extensive local spread and distal metastasis. The final case is of considerable interest. Biopsy specimens from this 70 year old male at this hospital and elsewhere were classified as adenoma malignum. Despite roentgen and radium therapy given at another hospital, the tumor grew slowly, invaded the perineum and bladder, and finally, six and one-half years after the first biopsy, caused obstruction and death.

Out of this entire group, one patient is living without recurrence, nine and one-half years after perineal resection, and 4 have died of carcinomatosis from a few months to six and a half years after operation.

Group III. Malignant adenoma associated with cancer

The final group of 7 cases comprises patients who underwent operation for carcinoma of the colon and rectum, and were found to have malignant adenomas in addition to cancer in the excised segment of intestine. Excluding 2 cases of intestinal adenomatosis, there were 5 which shared nine malignant adenomas between them. Here, of course, the malignant adenoma did not offer a therapeutic problem, but the case does indicate the association of these lesions and carcinoma. It also reveals the need for complete sigmoidoscopic and roentgenologic studies of the large intestine when either a cancer or an adenoma is found, in order to rule out the co-existence of the other.

Intestinal adenomatosis

Brief mention will be made of 2 cases of intestinal adenomatosis. The first, a 48 year old male, had a series of biopsies over a period of several years, the lesions being diagnosed as metaplastic and precancerous adenomas. Operation was performed only after the diagnosis of malignant adenoma was obtained. The rectum and sigmoid were removed and found to contain three separate carcinomas and many adenomas. This patient died of carcinomatosis five and one-half years after the first biopsy.

The second case is that of a 35 year old female who, in addition to adenocarcinoma of the appendix and the cecum, had malignant adenomas of the splenic flexure and ascending colon and hundreds of benign adenomas. A partial colectomy with ileosigmoidostomy was carried out, followed by perineal resection of the rectum with preservation of the sphincter. Four years later the appearance of adenomas in the sigmoid necessitated the resection of this portion of the colon. The patient is now alive and apparently well, four years after the first operation. Incidentally, her two sons have also been found to have intestinal adenomatosis. These 2 cases serve to emphasize the need for early radical treatment of this disease.

Comment

The treatment of adenoma malignum at The New York Hospital during this period was similar to that employed in many hospitals. The present study parallels that of Swinton[14a], who reported the material from the Lahey Clinic. In his report of 22 cases of malignant adenomas, 4 patients had further radical operations, because of the advanced state of the tumor. In none of these 4 cases was evidence of cancer found in the second specimen, and no recurrence had been noted in any of the 22 patients at the time of the report. His conclusion is that, although nothing but the most radical treatment is advocated for clinical cancer, there are a few freely movable, histologically malignant lesions which may be safely removed by local excision.

The experience of Scarborough[21], however, illustrates the hazards of such a program. From 182 patients, 13 polypoid lesions were removed, and microscopic examination showed cancer. Nine had radical resection, and three of the specimens showed residual

cancer. Because of the presence of long pedicles and only small areas of cancer, the other 4 patients had local excision only. Of those, 1 had a local recurrence after eight months, and 3 remained well, although at the time of the report the patients had been followed less than two years.

In contrast, 13 of the 14 patients who had malignant adenomas removed locally at the Henry Ford Hospital were alive without recurrence at the end of the fifth year (Colvert and Brown[14d]). Klemperer discussed the same problem in 1938 and stated that "the question about which I puzzle is the carcinomatous pedunculated polyp."[11d] He concluded with reservations that, judging from experience with 4 cases followed 3 years, early carcinoma in adenomatous polyps may not necessarily require radical resection, but may be excised with the immediately surrounding mucosa. Recently he has stated that the experience of intervening years has not caused him to change this belief[22].

The consensus is that *pedunculated* adenomas with malignant transformation may be treated locally. Experience has shown that the greatest care must be exercised in selecting the cases which are not to undergo radical surgical procedures. The problem requires the closest cooperation between the surgeon and the pathologist. The biopsy specimen must be adequate and carefully taken so as to include, if possible, the pedicle or base of the adenoma. A gross description of the lesion with reference to the size, fixation, ulceration, and the presence or absence of a pedicle is imperative. The pathologist, in turn, is most helpful if he understands the problems which confront the surgeon in his choice of operation.

Summary

1. A review of the literature concerning adenomas of the colon and rectum and their relation to cancer has been made.

2. Thirty-four cases in which the histologic diagnosis of adenoma malignum, precancerous polyps, or suspiciously metaplastic polyps was established have been reviewed. Twenty-two of these polyps were pedunculated, and were treated locally without cause for regret. Five were sessile lesions. Of these, 3 were treated by radical operations and found on examination to be adenocarcinoma; one was inoperable, and one patient died six and one-half years later of carcinomatosis. Seven patients were operated upon primarily for an obvious carcinoma of the colon, and malignant adenomas were found in the same segment.

3. From this review it would seem that certain pedunculated lesions exhibiting histologic evidence of malignancy but without invasion of the pedicles can be safely removed locally.

4. Sessile, ulcerated, fixed lesions, however, require radical removal and, in our experience, when the entire tumor is available for examination, it is often found to be frank carcinoma. The importance of careful histopathologic examination and correlation with the gross appearance of the lesion are emphasized.

5. The frequent occurrence of malignant polyps in company with frank carcinoma indicates the need for careful sigmoidoscopic and roentgenologic studies in all patients in whom either lesion is found.

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ENTEROGENOUS CYSTS OF THE CECUM

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LAURINBURG

An enterogenous cyst of the cecum is a rare clinical entity. I would like to report such a case and then to discuss important aspects of this condition.

Case Report

A 19 year old Indian male was admitted to the Scotland County Memorial Hospital on April 14, 1950, complaining of right lower abdominal pain of eight days' duration. During this time he had been nauseated, but had vomited only once. The pain was persistent in character. He had not had a bowel movement for four days, although he had taken a laxative two days before admission. Three years previously he had been admitted to another hospital with the same complaint. He stated that a mass had been found in the right lower quadrant of his abdomen, but that it disappeared while a physician was palpating it. The remainder of the past history, the family history, and review of systems were negative.

Physical examination: The patient was a well-nourished, 19 year old Indian male, somewhat dehydrated, but in no acute distress. His temperature was 100 F., pulse was 80, respirations were 24, and blood pressure was 150 systolic, 70 diastolic. The positive findings were limited to the abdomen, the right side of which was tender and moderately rigid. A mass about 5 inches in diameter was present in the right lower quadrant. It was round, tender, and freely movable.

Laboratory findings: A blood count revealed a hemoglobin of 13.5 Gm. (90 per cent), and the white blood count was 20,750 with 79 per cent polymorphonuclear leukocytes, 10 per cent lymphocytes, and 11 per cent eosinophils. A urinalysis was negative. A preoperative diagnosis of an abdominal mass of undetermined origin, probably an appendiceal abscess, was made.

Operation: After preoperative parenteral fluids had been administered, an operation was performed on April 15, 1950, under spinal anesthesia. The abdomen was entered through a right pararectus incision. A mass about 5 inches in diameter involving the cecum on its mesial aspect was found in close proximity to the ileocecal valve. The serosa of the cecum was injected and edematous. Many enlarged regional lymph nodes were present. The appendix appeared only moderately inflamed. The mass was causing partial intestinal obstruction. A resection of the terminal ileum, cecum, ascending colon, and proximal portion of the transverse colon, with an end-to-end anastomosis, was performed. After operation, the specimen was opened and the mass identified as a cyst within the wall of the cecum. The contents were seropurulent in nature. A Miller-Abbott tube was passed, a blood transfusion given, and fluids were administered intravenously. An uneventful convalescence occurred, and the patient was discharged on the tenth postoperative day. He has been seen several times in the outpatient department and is asymptomatic.

Gross pathology: "Specimen consists of segment of terminal ileum, cecum, ascending colon, and transverse colon. Segment of ileum is 12 cm. in length and segment of colon 25 cm. in length. Just distal to the ileocecal valve is an empty cavity which must have had a diameter of 8 to 10 cm. This is in an intramural location in the cecum. Its internal surface is covered by mucosa, and its external surface by cecal wall and peritoneum. Cavity has a rather rough, granular, gray-brown lining. Mucosa of the segment of bowel does not appear abnormal. In the mesentery attached to the bowel segment are a number of very large lymph nodes."*

Microscopic pathology: "Sections of that portion of the wall of the cyst projecting into the lumen of the cecum show relatively normal cecal mucosa on the outer surface, and a cyst lining of thin cecal-type mucosa. The latter is partially necrotic superficially, where there is acute inflammatory exudate. Each mucosa has a distinct muscularis mucosae. These are separated from each other by fibrous tissue containing scattered muscle bundles, lacking the arrangement and the bulk of normal muscularis, and mild edema and leukocytic infiltration.

"Sections through that portion of the wall of the cyst in apposition to cecal wall show inflamed lining mucosa of the cyst, with its muscularis mucosae. External to this is submucosa, with varied inflammatory cell infiltration and a few scattered muscle bundles, and then muscularis and subserosa, normal except for inflammatory infiltration."*

Incidence

According to Rea[5] enterogenous cysts are more prone to occur in females than in males, the ratio being 3 to 2. The youngest patient that I have found reported in the literature (Strode and Fennel[6]) was an infant two days old, while the oldest (reported by Drennan[2]) was aged 23 years.

Location

According to Lewis and Thyng[1], "cysts lined by intestinal epithelium wherever found in the abdomen must be derived from the gut. These are described as developmental enterogenous cysts." These cysts may develop in any part of the intestinal tract, but the site of predilection is in the terminal ileum and cecum. No adequate explanation for this fact has been given. In 1934

Read before the Section on Surgery, Medical Society of the State of North Carolina, Pinehurst, May 9, 1951.

From the Department of Surgery, Scotland County Memorial Hospital, Laurinburg, North Carolina.

* Reported by Dr. K. M. Brinkhous, University of North Carolina School of Medicine, Chapel Hill.

Hughes-Jones[4] reported 55 cases from the literature, 85 per cent of which occurred in the terminal ileum or cecum.

Mode of Origin

Several theories have been offered as to the etiology of these cysts. Drennan[2] believes that both cysts and diverticula of the intestines result from the growth of a bud or from a prolongation of epithelium which has pushed out into the mesenchyme. If an opening into the intestine occurs, a diverticulum results; if the bud becomes separate, a cyst is formed.

Lewis and Thyng[1] found that in the pig, rabbit, and human embryo diverticula of the small intestine occurred often and arose from the canalization of solid bud-like outgrowths from the bowel. Occasionally these diverticula become sequestrated from the bowel and form cysts.

Another theory is that these cysts may develop in connection with some unobliterated portion of the vitello-intestinal tract[3]. A fibrous vestige of this tract may exist, and a cyst is likely to form along some part of its course.

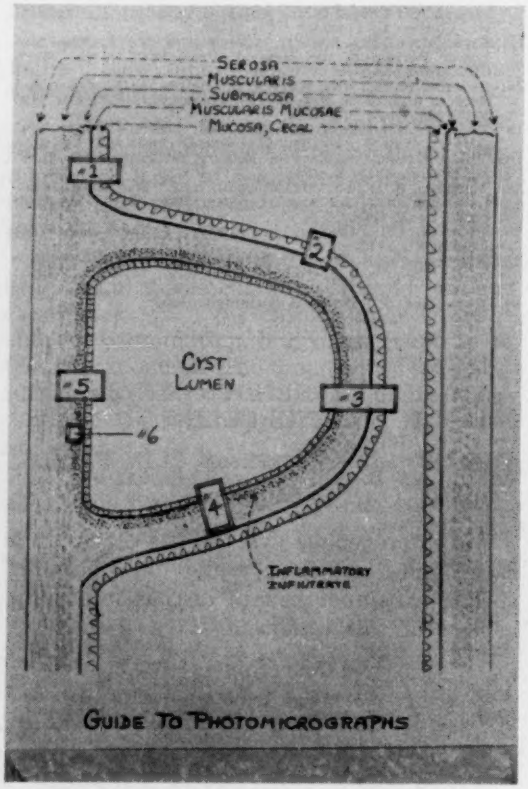
Pathology

Grossly, these cysts may be single or multiple. They range in size from microscopic structures to 20 cm. in diameter. They are unilocular, and their location may be submucous, intramural, or subserous. The cyst usually has a glistening, bluish membrane. The contents may be mucilagenous, gelatinous, serous, seropurulent, or sanguineous in nature, and colorless, yellow, or brown in appearance.

Microscopically, the cyst wall is usually found to be composed of all of the layers of the intestinal wall. However, any of the layers may be absent. The typical cyst is lined by a single layer of epithelium, which is usually tall and columnar in nature. Under the epithelium is the submucosa, and under this is a layer of circular and a layer of longitudinal muscle. Occasionally, villous folds are seen. Photomicrographs of a specimen removed at operation ilustrate these points.

Diagnosis

According to available literature no enterogenous cyst has been diagnosed preoperatively. The diagnosis is a difficult one and can be made only by keeping the entity in mind. When a mass is palpable in the lower right quadrant of the abdomen, an enterogenous cyst must be considered, along with an appendiceal abscess, an intussusception, regional ileitis, ovarian cyst, or granuloma of the ileum. Roentgen studies are of little aid, because these cysts have no connection with the lumen of the bowel. Roentgenograms, however, may show evidence of compression on the intestinal lumen.



A lateral view of the cecum showing the cyst projecting into the cecal lumen. The numbers serve as a guide to the microscopic sections.

Symptoms and Signs

Although a diversity of symptoms may occur, the usual presenting complaint is persistent pain in the right lower quadrant of the abdomen. The persistence of the pain is due to tension within the cyst. On the other hand, the pain may be intermittent in character, if partial or complete intestinal obstruction exists. The cyst may act as the starting point of an intussusception, with its characteristic symptoms.

The patient, as a rule, appears acutely ill. The temperature is elevated, the pulse rate

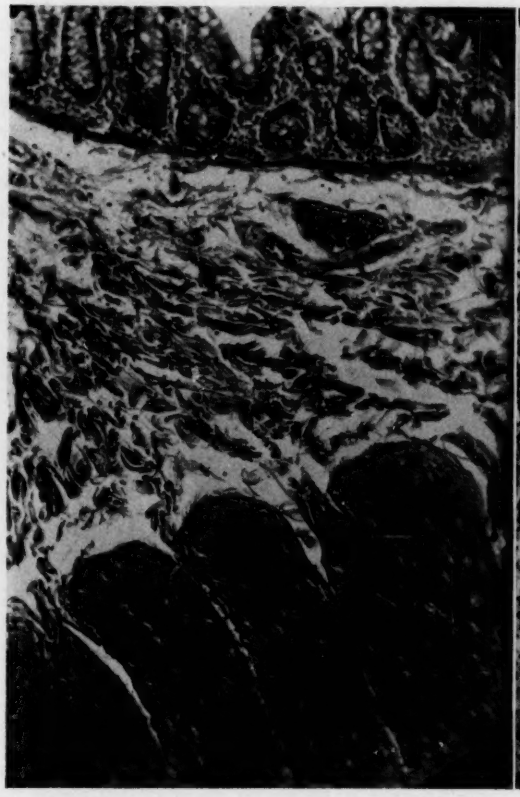


Fig. 1. Photomicrograph of normal cecal wall.

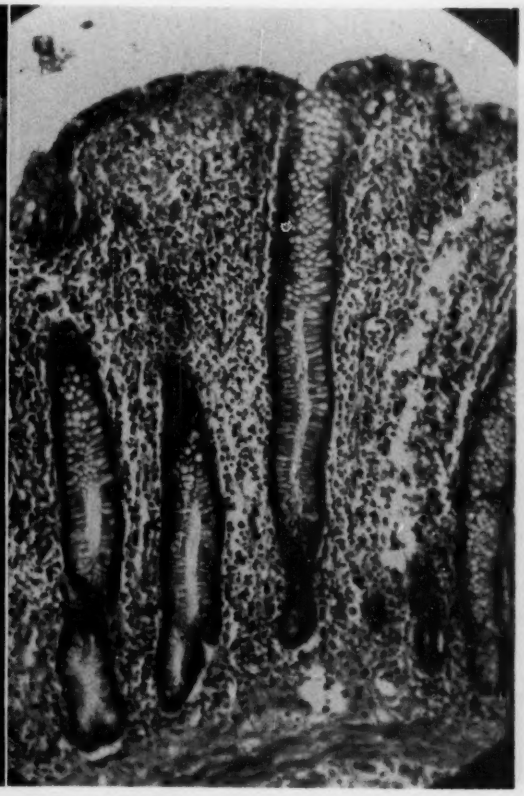


Fig. 2. Photomicrograph showing relatively normal cecal mucosa on outer surface of cyst.

accelerated, and a marked leukocytosis is present. Physical examination reveals marked tenderness and muscle spasm in the right lower quadrant of the abdomen. The outstanding physical sign, however, is a tense, globular, tender, mobile mass in the lower right portion of the abdomen. If a complication, such as intestinal obstruction or intussusception has occurred, the physical signs of the individual complication will be found.

Treatment

Although surgery is always necessary in the treatment of an enterogenous cyst, astute judgment as to the proper procedure is required. One of the following surgical procedures is usually employed: (1) intestinal resection with anastomosis; (2) enucleation of the cyst; (3) evacuation of the cyst; (4) marsupialization of the cyst.

As mentioned previously, it is very difficult to make an accurate preoperative diagnosis in these cases, and consequently the patient is not adequately prepared for intestinal resection. Add to this fact that these patients are acutely ill, and it can be seen why a resection is difficult and the mortality high.

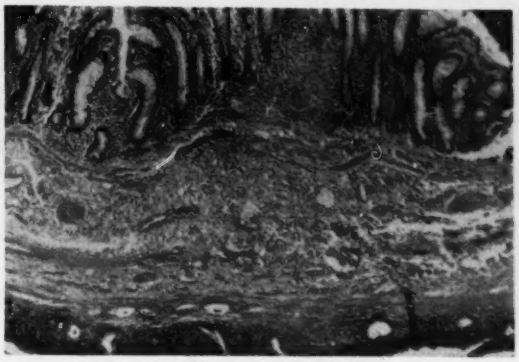


Fig. 3. Photomicrograph of cyst wall (part projecting into cecal lumen).

Since an enterogenous cyst is a part of the intestinal wall, it is practically impossible to enucleate the cyst without actually

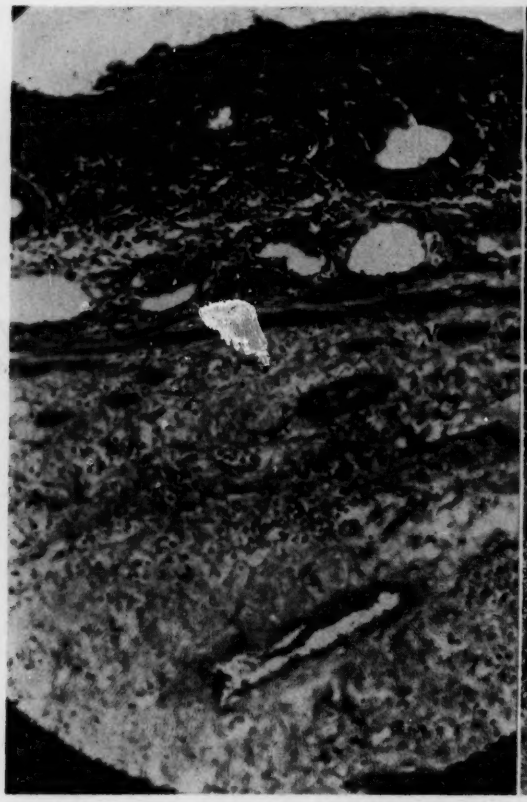


Fig. 4. Photomicrograph of cyst lining, showing inflamed, thin mucosa with its muscularis mucosae.

Fig. 5. Photomicrograph of cyst wall (portion in apposition to cecal wall).

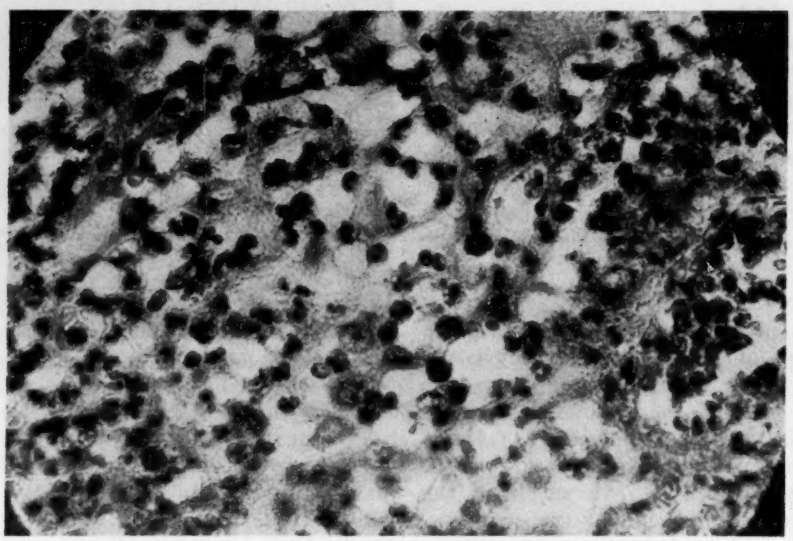


Fig. 6. Inflammatory infiltrate of section depicted in Fig. 5.

entering the intestinal lumen. Enucleation is thus a hazardous procedure.

Evacuation of the cyst is unsatisfactory, as refilling always occurs and there is danger of leakage into the peritoneal cavity.

Marsupialization is probably the most popular procedure. It relieves the symptoms, and the possibility of a primary cure is great. If a primary cure is not achieved, a secondary procedure can be performed at a later date when the patient is in much better condition for major surgery.

Summary

1. A case of enterogenous cyst of the cecum is reported.
2. A discussion of important aspects of this clinical condition is given.

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Discussion

Dr. C. E. Gardner, Jr. (Durham): I think the most important thing to remember is that an enterogenous cyst and that part of the intestine from which it arises have a common wall and a common blood supply, and that it is usually impossible to remove the cyst without also removing the bowel. The preferred treatment is, thus, an intestinal resection, which is what Dr. Patterson did.

If the cyst arises in an area where resection is hazardous, as in the duodenum near the ampulla of Vater, the cyst might be managed by excising a portion of the common wall between it and the bowel, so that it can be drained internally into the bowel.

Precedence When Several Physicians are Summoned.—When several physicians have been summoned in a case of sudden illness or of accident, the first to arrive should be considered the physician in charge. However, as soon as is practicable, or on the arrival of the acknowledged personal or family physician, the first physician should withdraw. Should the patient, his family or his responsible friend wish some one other than he who has been in charge of the case, the patient or his representative should advise the personal or family physician of his desire. When, because of sudden illness or accident, a patient is taken to a hospital without the knowledge of the physician who is known to be the personal or family physician, the patient should be returned to the care of the personal or family physician as soon as is feasible.

From the **Principles of Medical Ethics** of the American Medical Association.

MYOSITIS OSSIFICANS WITH REPORT OF A CASE IN PARAVERTEBRAL MUSCLE

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The term "myositis ossificans" brings to mind classic descriptions of the "rider's bone" of cavalrymen and the "drill bone" of soldiers who serve in the infantry. In civilian practice, this condition is found most frequently in young football players, basketball players, and, to a lesser extent, in miners.

Since Patin's first report in 1692, numerous cases of myositis ossificans have been recorded, and yet today, even with widespread use of the roentgenogram and other modern diagnostic aids, the condition is infrequently recognized and imperfectly understood.

Myositis ossificans is characterized by aberrant bony growth within skeletal muscle. It is usually divided into traumatic and progressive types. In this paper the discussion is limited to the traumatic type.

The primary lesion actually involves the fascial connective tissue; changes in the muscle are secondary and degenerative in character. Shipley[1] divides myositis ossificans into three anatomic types: (1) involvement of bone without extension into muscle; (2) involvement of muscle and adjacent bone; and (3) involvement of muscle without attachment to bone. The second type is most frequently seen.

Etiology

Among the interesting theories which have been advanced to explain the pathogenesis of myositis ossificans are these:

(1) That there is a transformation of organized hemorrhage into cartilage and bone;

(2) That trauma stimulates proliferation of aberrant sesamoid bone tissue;

(3) That detached pieces of periosteum grow into bone;

(4) That there occurs an escape of synovial tissue and fluid into periarticular tissue, followed by organization;

Read before the Section on Pathology, Medical Society of the State of North Carolina, Pinehurst, May 9, 1951.

From the Division of Orthopedic Surgery and the Department of Pathology, Watts Hospital, Durham, North Carolina.

(5) That there is metaplasia of intramuscular connective tissue to bone;

(6) That the process results from a combination of metaplasia and periosteal proliferation.

Hirsch and Morgan[2] believe that an individual diathesis or dyscrasia must be involved. In a study of various tendons of 25 cadavers they demonstrated that fibrocartilage is distributed as a normal tissue component in areas where traumatic ossification occurs. They think that this fibrocartilage is probably the matrix from which traumatic ossification develops.

Schwartz[3] reported a case of circumscribed ossification in the soft tissues of the abdominal wall following prostatectomy. He believes that in such cases cells from the bladder mucosa may be implanted, and that after injury to the pubic periosteum, metaplasia of connective tissue occurs, with resulting new bone formation. It has been shown experimentally that apparently the presence of bladder epithelium or epithelium from the kidney pelvis or ureter greatly enhances the process of ossification.

Hirsch and Riley[4] compared the pathologic processes of spondylitis deformans and of traumatic myositis ossificans. They proposed that physiologic endochondral ossification occurs in each disease: in the former, in the fibrocartilage of ligaments, as a result of the trauma of stress; in the latter, in the fibrocartilage of tendons, as the result of a single severe injury or repeated minor injury.

Geschickter and Copeland[5] state that the source of the new bone is fibrous strands in the muscle, or tags of precartilaginous embryonic connective tissue (or blastema) displaced from the primitive periosteum. Some new bone apparently arises from periosteal stripping (by injury), with direct ossification of the membranous type. Other new bone seems to be derived from cartilage, which must involve blastemal tissue. It also seems to be important that a hematoma be present in order for ossification to occur.

Recent experimental work indicates that the stimulation to ossification is chemical in nature, increased calcium deposition taking place locally in the presence of an injured blood supply. However, the systemic blood calcium, phosphorus, and phosphatase levels are normal in myositis ossificans, and there has been no evidence that hormonal imbalance is in any way responsible for this condition. The disease usually occurs in healthy, well developed people. An hereditary predisposition has been suggested as an etiologic factor, but this hypothesis has never been proved.

A frequent exciting factor is trauma, although in a large proportion of the cases a history of specific injury is not obtained. Certainly the aberrant osseous formation is not a normal reparative process or it would be seen much more frequently following fracture. There must be an obscure growth-regulating factor which plays a significant role in the etiology of this condition.

Pathology

When examined at the operating table, the bony growth is usually surrounded by a gelatinous substance which appears to be the result of muscle degeneration. A fibrous capsule usually lies beneath this material. Irregularly distributed bands of connective tissue radiate from the capsule. Cystic changes are sometimes seen; when they are present, the gross specimen may be confused very easily with a giant cell tumor[6].

Geschickter and Maseritz[6] studied 25 cases of traumatic myositis ossificans and classified the ossification histologically as (1) typical, (2) cartilaginous, (3) angiomatous, (4) myxomatous, and (5) malignant.

In the earliest histologic phase of a typical lesion there are degeneration of striated muscle fibers, hyperplasia of connective tissue, and organization of hemorrhage. There is a tendency to capsule formation. Islands of osteoid tissue surrounded by osteoblasts appear later. Capillary slits form, and marrow spaces are seen. There are occasionally small collections of colloid-like material, presumably osteomucin. These areas apparently form nuclei for future bone spicules.

Cartilage, and occasionally pseudocartilage, may be present. Myxomatous tissue is not uncommon; it may simulate osteogenic sarcoma, and when there is also cartilage, it may resemble chondromyxosarcoma. Angiomatous tissue is rather frequently seen.

Bowers[7] compared the histopathologic findings in a case in which the lesion was finally absorbed with those of a case in which the lesion persisted and required operation. The former showed a predominant number of giant or osteoclastic cells. These cells were not seen in the specimen which was not absorbed.

Diagnosis

In a typical case of traumatic myositis ossificans there is a history of moderate or severe injury, followed by hemorrhage into the muscle and the formation of a hard tumor. The condition occurs most frequently in males between the ages of 20 and 40. In this country it is most common following a single injury to football players and other athletes.

In thirty cases studied by Geschickter and Copeland[5] the muscles most commonly involved were the brachialis anticus and the quadriceps femoris. However, no muscle group is exempt.

The most constant symptom is pain. It may be of short duration, persistent, or progressive for varying periods of time. When the lesion is near a muscle or a joint, limitation of motion may result. In the early phase of the disease there is a doughy, tender swelling which gradually increases in size and becomes more and more firm.

Ossification usually is present after three to six weeks. The growth is self-limited, and usually becomes stationary after the sixth week. There may be a mass which varies in size and consistency for as long as six months. If absorption does not occur, the mass may persist for years.

Roentgenograms usually show a single, more or less wedge-shaped area of laminated bone, separated from normal bone by soft tissue throughout most of its length. Its edges are usually smooth and well defined. Variations occur in which the wedge of new bone may adjoin normal bone. One free edge may be irregular; this edge may assume the appearance of the "dotted veil."[5]

At times ossification may be extensive and closely imitate osteogenic sarcoma. Firtel[8] reported such a case in a 35 year old white male. Pack and Braund[9] reported three cases of myositis ossificans in which malignancy subsequently developed. Shipley[1] found four similar cases in the literature, and Geschickter and Copeland[5] recorded two.

Although myositis ossificans is found most frequently near the long bones, it may develop in any of the muscle groups of the body; but we were able to find reports of only 2 cases involving paravertebral muscle. Geschickter and Maseritz[6] reported involvement of the lumbar muscles in an 18 year old white male. Birge[10] and his colleagues recently reported a similar case in a 10 year old girl. In the following case, myositis ossificans was again found in the paravertebral region.

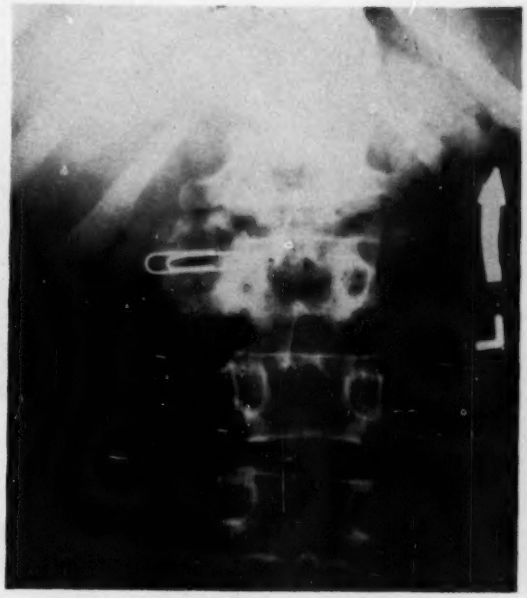

Fig. 1. The paper clip indicates the lesion involving the tissues in the region of the right transverse process of the second lumbar vertebra.

Case Report

A 17 year old white boy was admitted on September 8, 1950, to the orthopedic service of Watts Hospital under the care of Dr. Beverly Raney.

The patient stated that about two months prior to admission he had begun to have a vague aching pain in the right lumbar region. He had been doing heavy work, including lifting, but he did not recall any particular strain. His pain gradually became worse, and he consulted a physician who told him that he probably had an acute back strain and treated him for this condition. Relief was not obtained.

About ten days before admission the pain became quite severe, roentgenograms were made, and a "bone tumor" was found. He was then referred to Dr. Raney for treatment. The pain radiated to the right flank in the mid-axillary line. There was no radiation to the abdomen nor to the legs. The pain was increased by motion of the back, coughing, and sneezing. It persisted in recumbency. There was no history of previous attacks of back pain. The patient estimated that he had lost at least 15 pounds in the month prior to admission; he attributed this to loss of appetite.

Physical examination showed a tall, slender, young white male who did not appear to be acutely ill. The examination was negative except for findings referable to the right mid-lumbar area. In this area there was tenderness, especially to the right of the second lumbar vertebra. On attempted flexion of the back there was sharp lumbar spasm. The knee and ankle jerks were normal. There were

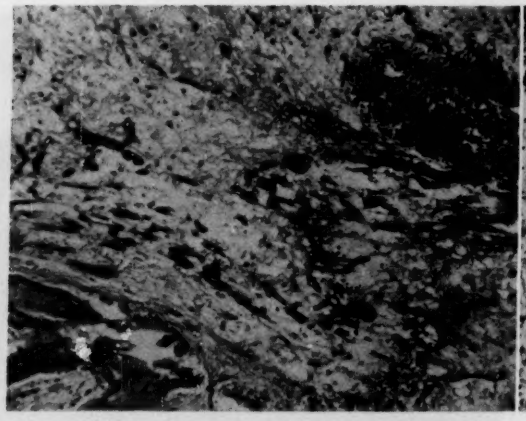

Fig. 2. Photomicrograph showing a chronic inflammatory process in degenerating muscular tissue adjacent to the bony mass (X 110). Hematoxylin and eosin.

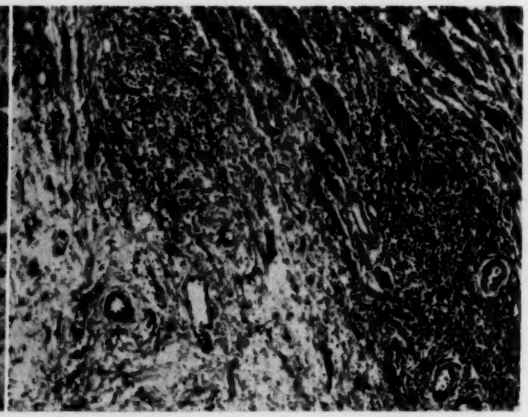

Fig. 3. Here the degenerating muscle cells are widely separated and are intensely eosinophilic. (X 110) Hematoxylin and eosin.

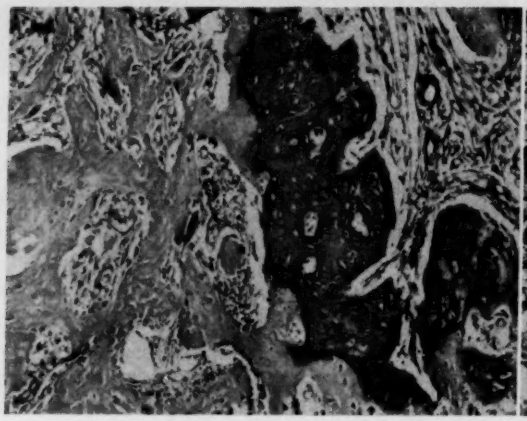

Fig. 4. Photomicrograph showing osteoid tissue and irregular bony spicules (X 110). The marrow spaces are occupied by loose vascular connective tissue containing scattered inflammatory cells. Hematoxylin and eosin.

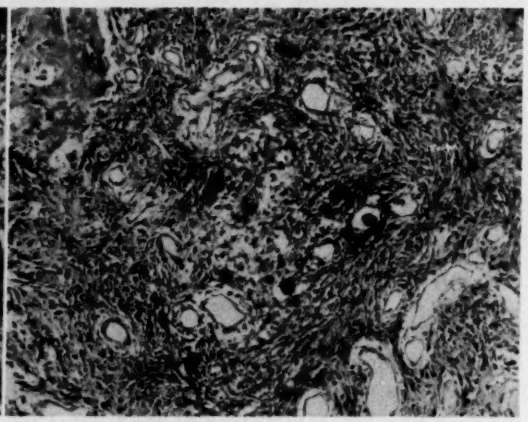

Fig. 5. This dense vascular connective tissue contains several giant cells. The area was surrounded by osteoid tissue, a little of which is seen in the upper left. (X 110) Hematoxylin and eosin.

no changes in sensation in the legs. The lower extremities were equal in length and size. Hip abduction was free. There was no pain on straight-leg-raising.

The blood pressure and the routine laboratory tests were within normal limits. Roentgenograms of the lumbosacral spine (fig. 1.) showed a bone tumor occupying the transverse process of the second lumbar vertebra on the right side, measuring 4 by 3 by 2 cm. This was a mottled osteolytic and productive expansile lesion, apparently arising in the transverse process, expanding it, and completely destroying its normal architecture. This lesion did not appear to have broken through the limits of the bone capsule. There appeared to be no deformity of any of the adjacent structures, and the tumor lay in the usual position of the transverse process.

On the fifth hospital day the mass was removed. The patient had an uneventful postoperative course, and was discharged in good condition on September 16, 1950.

The gross specimen consisted of a large piece of tissue measuring about 5 by 4 by 2.5 cm. One end of this was spongy bone, representing the point of separation from the second lumbar vertebra. The remainder was an irregular bony mass covered by soft tissue, including muscle. There were, in addition, a number of smaller fragments of soft tissue and chips of bone.

Microscopically, the soft tissue (fig. 2) consisted of striated muscle, fat, and areolar tissue which were involved by a chronic inflammatory process. The predominating cells in the exudate were lymphocytes and plasma cells. The muscular tissue showed degenerative changes consisting of swelling of the fibers and an increased affinity for eosin (fig. 3). Fibrosis was taking place within the muscular tissue. There was fresh hemorrhage in this soft tissue from the operative procedure, but no evidence of old hemorrhage was seen.

The hard tissue, which was decalcified, showed considerable variation in its appearance. Much of it was composed of normal mature spicules of bone, with an orderly arrangement of osteoblasts along their surfaces. Another large portion consisted of osteoid tissue (fig. 4) in the form of both narrow

and broad ribbons. The osteoid was in close association with bundles of hyalinized collagen, which presented a pattern similar to the osteoid, and it seemed clear that the osteoid had its origin from this altered connective tissue. It was often impossible to tell where one ended and the other began. The marrow spaces between the osseous and osteoid spicules were not occupied by red marrow, but rather by connective tissue. Some of this was loose areolar tissue consisting of fine collagen fibrils and scattered fibroblasts, and containing rather large vascular spaces. In other places the bundles of collagen were coarser, and formed a dense interlacing network containing numerous fibroblasts. There were some rather large islands of this dense connective tissue, in which numerous multinucleated cells interpreted as osteoclasts were seen (fig. 5). Inflammatory cells of various types were scattered through the connective tissue portion of the lesion.

The diagnosis was not apparent to us, because of the remarkable variation in the pattern of the lesion, but the process was considered benign. A consultation with the Armed Forces Institute of Pathology was obtained, and their diagnosis was myositis ossificans of the paravertebral type. The Institute has collected a number of these lesions arising in the same area which have been mistaken for sarcomas. Long term follow-up has demonstrated their benignancy, even in cases in which the patients have died from bladder infections and decubitus ulcers due to cord compression by the mass[11].

Differential Diagnosis

When one encounters a paravertebral mass of bony tissue in a young adolescent or a child, particularly following trauma, the following conditions must be considered:

1. *Benign conditions characterized by excessive bone formation—ossifying periostitis, ossifying hematoma, and myositis ossificans.* Ossifying periostitis usually occurs along bony prominences, and bone proliferation is not extensive. Ossifying hematoma may be essentially the same condition as myositis ossificans, except that it occurs in tissue other than muscle.

2. *Benign bone tumors—osteochondromas, chondromas, giant cell tumors, or hemangiomas.* Giant cell tumors cause pain and bone destruction, and are most frequently seen in the vertebral body. The vertical striations in the body of the vertebra as seen roentgenographically are pathognomonic of hemangioma. Rarely does osteochondroma involve vertebrae.

3. *Malignant tumors—metastatic lesions and osteogenic sarcoma.* Metastatic lesions are more common and are usually multiple in the spine. Osteogenic sarcoma demonstrates much bone destruction as well as new bone formation, invades the surrounding tissue, and is usually rapidly fatal.

4. *Infectious diseases—tuberculosis, pyogenic osteomyelitis, typhoid osteomyelitis, brucellosis, blastomycosis, and syphilis.* Results of specific tests, roentgenographic appearance, and clinical course are usually sufficient to provide differential diagnosis[10].

If there is doubt as to diagnosis, biopsy is indicated, but giant cell tumor and osteogenic sarcoma may be so closely simulated by myositis ossificans that even histologic diagnosis is difficult.

Treatment

Prophylactic treatment of myositis ossificans includes avoidance of massage, the application of cold compresses or ice packs, and the use of a compression bandage immediately after injury in order to reduce hemorrhage. Thorndike[12] states that evacuation of a hematoma in its early stages is contraindicated.

Persistence of symptoms after an injury is an indication for periodic roentgenographic examination to rule out early myositis ossificans.

Thorndike[12] recommends excision only in cases in which ossification has occurred near a joint, or in the origin or insertion of a muscle, or in which function has been permanently impaired. Even when there is much impairment, however, he advises delay of operation until twelve to twenty-four months after injury.

The best treatment is watchful waiting[5]. It is inadvisable to intervene surgically in the early stages of tissue reaction to trauma, since growth may be stimulated and recurrence may result. Recurrence is common, especially if surgery is undertaken before six months or if the resection is incomplete, traumatic, or performed without proper regard for hemostasis.

Bowers[7] divides these cases into (1) those in which no treatment is necessary, (2) those in which conservative treatment is sufficient, and (3) those in which operation is necessary. In the first group, small, calcified, symptomless areas are discovered during examination for other difficulties. In the second group, the calcified area is more extensive, symptoms are present, and there is some disability. In this group, gradual absorption of the mass usually takes place in from five to twelve months after its appearance. The third group consists of cases in which absorption does not occur after the proper period of rest and observation. The mass in these cases is virtually always located in the region of a joint, and

disables the patient by limiting joint motion.

Thorndike[12] found that in 36 per cent of his cases the lesions were absorbed spontaneously after a period of several months to five years. Smaller areas and those in the upper extremities have a greater tendency to disappear.

Summary

The pathologic aspects of traumatic myositis ossificans have been discussed, the clinical picture has been briefly reviewed, and a case involving paravertebral musculature has been described.

Abstract of Discussion

Dr. R. B. Raney (Durham): In the case described, the absence of a history of injury, the persistent and increasing pain unrelieved by symptomatic treatment, and the weight loss suggested a malignant condition, despite the benign roentgenographic appearance of the lesion. Surgical exploration and excision of the mass were thought to be indicated from both diagnostic and therapeutic standpoints. The region of the right transverse process of the second lumbar vertebra was approached through a 4 inch longitudinal, paraspinal incision, exposing a rounded, lobulated, hard mass about 1½ inches in diameter, which included the transverse process and from which the soft tissues were dissected without unusual difficulty. This mass was resected at its base from the vertebral body. The dissection was facilitated by the use of the electric scalpel, and there was very little bleeding.

This patient has been seen five months after operation, at which time he was carrying out his usual activity without pain. There was no tenderness, stiffness of the back, or pain on motion of the back.

The progressive form of myositis ossificans, which is associated usually with congenital deformities and is relatively rare, is quite distinct clinically from the localized or traumatic type, which forms the basis of the present discussion. Traumatic myositis ossificans occurring in the extremities is usually recognized with ease because of typical clinical and roentgenographic characteristics. Its treatment is well established, and consists of local rest, followed in a minority of cases by surgical excision when necessitated by symptoms of a mechanical nature persisting in its mature stage. However, in rare cases of extremity involvement, pain and resorption of bone may make differentiation from osteogenic sarcoma or other malignancy difficult.

Instances of needless amputation have occurred. Parosteal osteoma, which may give a very similar clinical and roentgenographic picture, must be differentiated. In such cases, biopsy is indicated.

Traumatic myositis ossificans of paravertebral musculature is uncommon, and in the past has presented a somewhat confusing picture. In recent years, much work has been done at the Armed Forces Institute of Pathology to clarify this entity. Dr. Lent Johnson of the Institute recently presented an exhibit at the American Academy of Orthopedic Surgeons meeting, demonstrating well the varied histologic picture of these lesions, which may, in different parts of the specimen and different phases of its development, simulate closely other entities.

The surgeon who performs a biopsy in this type of case should provide the pathologist with a cross-section of the entire lesion and with adequate clinical data. We should all become familiar with this lesion, which can be recognized and treated with satisfaction.

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CLINICAL ASPECTS OF THE TREATMENT OF SYPHILIS

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Syphilis continues to be a major disease, as evidenced by the report of the year 1948 of 338,141 new cases affecting 127,210 white and 210,931 non-white individuals[1]. With the advance of medicine and the development of new antibiotics, there has been remarkable progress in the field of syphilis therapy. It has become comparatively easy and inexpensive to treat syphilis adequately, without jeopardizing the life of the patient by therapeutic mishaps.

Diagnosis

An ever important part of the treatment of syphilis is establishing the diagnosis—a task which today has become much more difficult than physicians in general realize. In this age of multiple injections and transfusions, the possibility of needle transmission is higher than in the past. Cases have been reported in which infected blood was given to the innocent recipient prior to the development of genital lesions or positive serologic reaction in the donor.

Diagnosis has also been complicated by the

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nearly universal practice of treating gonorrhea with penicillin. The penicillin may prevent the development of the typical luetic genital lesion, thus depriving the physician of the one sure means of establishing the diagnosis—darkfield demonstration of *Treponema pallidum* obtained from the lesion. Syphilis will subsequently be manifest by a positive serologic reaction. The treatment of other diseases with penicillin may have the same subsequent effect on syphilis, especially if these other diseases are treated during the critical luetic development period.

Genital lesions to be differentiated from syphilis are: chancroid; lymphopathia venereum; scabies; granuloma inguinale; trauma; herpes progenitalis; neoplasm; allergy; histoplasmosis; erosions and ulcerations secondary to purulent urethral discharge, especially that due to gonorrhea; insect bites.

In general it may be said that the appearance of the lesion is of little aid in establishing the etiologic diagnosis. *Treponema pallidum* has been demonstrated in the most innocuous appearing lesion. Estimation of the incubation period is of very little value. One lesion harbouring both the organism of chancroid, *Hemophilus ducreyi*, and that of syphilis may develop, yet the lesion may have appeared in the time interval usually associated with chancroid. An aid in the differential diagnosis in this instance is the response of the lesion to sulfadiazine. Sulfonamide drugs usually clear up the uncomplicated lesion within five days, but it must be remembered that the classic course of the luetic lesion is spontaneous regression and disappearance after a variable period of time.

Whenever asymptomatic syphilis is suspected and the diagnosis must be made by serologic reaction, it is necessary that tests be made monthly for three consecutive months. If after this period the blood is still negative, it may be presumed that the subject does not have syphilis.

Serologic Testing

The various serologic tests for syphilis that have been developed are nearly as numerous as the trade names of the various penicillins that are used in the treatment of this disease. The multiplicity of tests indicates that no one test is ideal and that all have the same defect to a variable extent. As is well known, none of the commonly used tests available for syphilis incorporates a true antigen-antibody type of reaction. Why the tests used in making the diagnosis respond positively in the presence of syphilis is still an immunologic problem. It is realized that some of the material used may be similar to the protein molecular makeup of the *Treponema pallidum*. Recently, however, it has been possible to culture a strain of treponema which is considered to have the same antigenic response as *Treponema pallidum*. In comparing the reactions of this antigen in a serologic test with the antigens of the alcoholic tissue extract type reinforced with cholesterol, Kolmer, Kast, and Lynch concluded that the differences obtained were insignificant and that probably the spirochetal antigen could not be used because of the large percentage of nonspecific complement fixation antibodies[2]. Beck found the two antigens to be of similar specificity[3]. Eagle and Hogan favor the use of the spirochetal antigen (Reiter strain)[4].

Types of tests

There are two types of serologic tests: (1) the complement fixation test, and (2) the precipitin test. The Kolmer modification of the Wassermann test is the complement fixation test in general use in this country. Precipitin tests are exemplified by the Eagle, Hinton, Kahn, and Kline tests. These five are the tests most commonly used for serodiagnosis. There is less than 10 per cent difference in sensitivity and less than 1.0 per cent difference in specificity among the five tests. Serologic tests for syphilis, as of 1935, in American studies done on 415 cases of confirmed syphilis, ranged from 65.8 per cent to 88.2 per cent in sensitivity and approximately 99.5 per cent in specificity[5].

The United States Public Health Services recognize and use the following tests: Eagle, Hinton, Kahn, Kline, Kolmer, Mazzini, Rein-Bossak, and V.D.R.L.[6]

In making a serodiagnosis of syphilis, it has been customary to use two tests, and the most frequent combination is the Kahn and Kolmer. An evaluation of the literature will show that there is little, if any, difference in sensitivity and specificity between these two tests, and actually a comparison of two Kahn tests done at different times would be just as significant. In the early development period of these tests, a complement fixation test, such as the Kolmer, was thought to be more specific than a precipitin test. This is not true under clinical testing conditions.

The greatest advancement in serologic test-

ing that has been made in the last ten years is the use of standardized quantitative Kahn test. This test enables syphilologists to follow the progress of the disease and to determine the efficiency of treatment. A serologic relapse occurs before there is a clinical relapse, and this method of testing enables the physician to reinstitute treatment without significant delay.

False positive reactions

To avoid making serious mistakes, the clinician should be aware of diseases that give biologically false positive reactions. The following conditions are known to give false positive reactions in some instances: leprosy (60 to 70 per cent of the cases); malaria (10 to 20 per cent of the cases); yaws; tuberculosis; trypanosomiasis; acute bronchitis; pleural exudate; pneumonia; psoriasis; lupus vulgaris; acne; cerebral hemorrhage; schizophrenia; epidemic encephalomyelitis; eclampsia; cholecystitis; measles, senile cachexia; renal insufficiency; Parkinson's disease; thrombophlebitis; bilirubinemia; menstruation; malignancy; Boeck's sarcoid.

The diseases listed leave few pathologic states which are not capable of giving a false positive reaction. If it is remembered that false positives are invariably associated with a diseased state, mistakes may be prevented. The duration and intensity of these false positives may be prolonged over a period of weeks to months. Especially in malaria a strongly titered Kahn, such as 256, may be obtained.

Serologic syndromes

In order to treat syphilis intelligently one must be aware of certain serologic syndromes. In the older literature frequent mention is made of "serum fastness" and serologic relapse. With the advent of penicillin, we now know that there are asymptomatic reinfections which, in the past, have certainly been called treatment failures.

Serum fastness is a fixed positive reaction which will not become negative regardless of the intensity or duration of treatment. This condition is most likely to occur in the late stages of syphilis.

Serologic relapse is the reversion of the serum from a negative reaction back to a positive reaction. A serologic relapse also occurs whenever the quantitative Kahn titer starts rising after having been brought to a low level by treatment. As previously stated, this rise in the quantitative Kahn titer precedes a clinical relapse.

The serologic relapse must be differentiated from an asymptomatic reinfection. Relapse is a treatment failure. A reinfection is an immune or prophylactic failure. The differentiation of reinfection from relapse has been considered a difficult and controversial subject. Work done experimentally on rabbits has shown that reinfection could be produced in animals with acute or latent syphilis within ten days after the completion of adequate penicillin treatment.

"The manifestations of the disease resulting from the second spirochaetal invasion varied with the duration of the first infection and the subsequent development of local and systemic immune forces by the host. All animals adequately treated for early syphilis could be reinfected, yet only 27 per cent developed a new lesion at the site of the second induced invasion. Fifty-three per cent of the animals treated for latent syphilis developed asymptomatic reinfections."(7)

This condition is now thought to occur in human beings, and it has been stated that the titer in an asymptomatic reinfection becomes higher than the titer in the initial infection, enabling syphilologists to differentiate relapses from reinfections(8).

Treatment and Results

Shortly after the discovery of penicillin as a useful antibiotic in the treatment of bacterial diseases, it was tried on treponemal infections. Mahoney and colleagues, in 1943, reported the use of 1.2 million units of penicillin, administered in 20,000 unit doses at three-hour intervals for sixty injections over a period of seven and one-half days, in four cases of darkfield positive primary syphilis(9). Mahoney's four original cases have now been followed for six years, and there has been no clinical or serologic evidence of relapse. Since that time the penicillin fractions have been purified, and new antibiotics have been introduced. It has been demonstrated that Bacitracin in combination with penicillin has a synergistic effect and gives good results in animal therapy. Aureomycin has been shown to be extremely effective, as has Chloromycetin. Streptomycin is ineffective.

An evaluation of the clinical effects of penicillin therapy is as yet extremely difficult. When penicillin first became commercially available, emphasis was on production, and, as a result, various types were marketed. Subsequently, it became apparent that all strains of penicillin did not have the same degree of efficacy, and that penicillin K was

ineffective.Today the treatment of syphilis is done with modifications of penicillin G, the most effective strain discovered to date. Modifications are directed in such a fashion as to prolong the duration of elevated serum levels of penicillin without altering its antibiotic potency.

In evaluating the results of penicillin in the treatment of syphilis, consideration must be given to the stage of the disease that is treated. The best results are obtained in the treatment of early cases. Primary syphilis with a seronegative reaction makes the best response to treatment. Primary syphilis with seropositive reaction and secondary syphilis make the next best response. Early latent syphilis of less than four years' duration responds better than syphilis of longer duration. Primary, secondary, and early latent syphilis treated with an adequate amount of penicillin over a sufficient period of time has a cure rate of about 84 to 88 per cent.

Insufficient period of observation has made it difficult to evaluate the effects of penicillin therepy on late and tertiary syphilis. The cure rate, however, is much lower than that found in early syphilis, and reports from different sources indicate marked variation in results and conflicting conclusions. In general, the consensus seems to be that reversal of the serologic tests for syphilis occurs infrequently. Scully, Falk, and Stokes, in a follow-up study of patients over a period of six months to more than two years, observed that less than 10 per cent of the patients with late symptomatic neurosyphilis showed complete serologic reversal[10]. Serologic fastness of the blood, however, does not mean that the same state exists in the spinal fluid.

Neurosyphilis

In an observation period of more than two years, Stokes, Falk, and Gammon, of the University of Pennsylvania, found that, in the treatment of neurosyphilis with penicillin alone, the following results were obtained: normal spinal fluid in 80 per cent of the patients with tabes; in 74 per cent of those with asymptomatic neurosyphilis; in 60 per cent of those with taboparesis; and in 46 per cent of those with paresis. They concluded that penicillin is superior to other forms of treatment for all types of neurosyphilis[11]. It has been shown that in syphilis of the central nervous system, improvement continues to occur more than two years after the completion of penicillin therapy.

In all lesions of gummatous lues treated at Delgado Memorial Hospital Rapid Treatment Center, New Orleans (16 cases treated during the last two years), rapid clearing of the lesion and lowering of the Kahn titer have resulted, but no reversal of the positive serologic reaction. This has been the experience in gumma therapy in other parts of the country. A case of a gummatous lesion that was not affected by penicillin but was rapidly resolved with bismuth and arsenical treatment has been reported[12].

Cardiovascular syphilis

The efficacy and mode of treatment of cardiovascular syphilis are points of controversy. There are competent groups which believe that all patients with cardiovascular lues should be handled with especial care, prepared with heavy metals, and then treated with penicillin. Another trend is towards the initiation of therapy with full doses of penicillin. Moore feels that the risk of the Herxheimer reaction to penicillin in cardiovascular syphilis has been greatly exaggerated[13]. Forty-five patients with cardiovascular lues who, according to their histories, have never received anti-luetic therapy, have been treated at the Delgado Rapid Treatment Center with full therapeutic doses of penicillin without untoward reactions. All the patients are still living, but it is too early to evaluate the results of therapy. It has been shown by Moore, Padgett, and Stratton that the life expectancy of treated cases of cardiovascular lues is nearly one and three-quarters times that of untreated cases.

Treatment of former syphilitic women during pregnancy

A perennial question in the therapy of syphilis is that further treatment of once syphilitic women during subsequent pregnancies. In a study by Goodwin and Farber, it was concluded that it was not necessary to administer antisyphilitic treatment to a previously syphilitic woman during pregnancy, provided that she has received (1) 4.0 Gm. or more of arsphenamine or the arsenical equivalent, with bismuth; or (2) 2.4 million units or more of penicillin, given either in early or late latent syphilis, administered either during a previous pregnancy or during a non-pregnant interval. It is recommended that a syphilitic woman be further treated in any pregnancy in which there is clinical evidence of active infection or in which the

Table 1

Penicillin Schedules Used in the Treatment of Secondary Syphilis and Results of Therapy

Types of Penicillin	*Total Dosage in Million Units*	*Dosage Schedule*	*Duration of Therapy (days)*	*No. Cases*	*Seropositives Before Treatment (Percent.)*	*Period of Observation (months)*	*Seronegatives at end of Observation Period (Percent.)*
Crystalline G	2.4	40,000 units every 3 hours	8	234	100	12 24	75.4 80.9
Crystalline G	4.8	80,000 units every 3 hours	8	243	99.6	11-12 24	77.4 83.0
Crystalline G in peanut oil and beeswax	4.2	300,000 units every 3 hours	14	49	98.0	24	70.3
Crystalline G	7.2	200,000 units every 2 hours	3	114	100	18-21	85.4
Crystalline G in peanut oil and beeswax	9	600,000 units every 24 hours	15	219	99.1	15-18	80.2
Crystalline G in peanut oil and beeswax	18	600,000 units 3 times a week	70	81	100	15-18	95.8

blood test is positive in a quantitative titer of 16 or more dilutions[14].

Complications

The complications that may develop during the treatment of syphilis are few and inconsequential. The most dramatic complication seen with penicillin and other antibiotic treatment is the Jarisch-Herxheimer reaction. This reaction is manifested in two forms: (1) the febrile or systemic form, marked by chilliness, elevation of temperature, malaise, headache, and nausea, and in some patients by the temporary aggravation of previously mild psychotic symptoms; and (2) the focal or cutaneous form, characterized by edema or pain in the primary ulcer, enlargement of or pain in the regional lymph nodes, intensification of a secondary eruption or of other local lesions, or the development of a generalized roseola in a case of primary syphilis. All these signs and symptoms occur between four and forty-eight hours following the initial injection of penicillin. This reaction occurs most frequently in early syphilis, and is observed whether the patient is treated with heavy metal or penicillin.

Occasionally one sees a patient who becomes clinically worse after treatment with penicillin. These are patients with cardiovascular lues. It is thought that the treatment has eliminated the foci of spirochetal infection and resultant scar tissue forms, constricting the blood vessels. This results in a greater degree of ischemia than was formerly present, making the patient feel worse instead of better. Fortunately, this complication, the "therapeutic paradox," is rare and should not discourage treatment.

A complication that was formerly seen when arsenical products were used in the treatment of syphilis was the "nitritoid crisis." This was a condition of vasomotor shock, coming on immediately after the intravenous administration of the arsenical compound. It does not occur with penicillin therapy.

Dosage of Penicillin

The dosage schedule in the treatment of syphilis is still quite flexible, and the correct amount to be administered in the various phases of syphilis is still being determined. In the past four years ideas as to how much penicillin to give, how often, and over how long a period of time have changed. It will be at least two decades before most of the problems are settled. To date, it has been concluded that the minimum effective dosage of penicillin is expressed as an amount acting over a period of time. The various dosage schedules that are being presented give blood levels of penicillin many times higher than the minimal amount required for spirocheticidal effects. The favored brand of penicillin used in the ambulatory therapy of syphilis, procaine penicillin G, with 2 per cent aluminum monostearate in peanut oil, maintains levels higher than the minimal level for a period of forty-eight hours and longer when given in 600,000 unit dosages.

Routinely, all patients that are to be treated for syphilis have the following tests before treatment is started: (1) darkfield examination when indicated; (2) serologic

test for syphilis with quantitative Kahn tests; (3) spinal taps in all cases of syphilis that have progressed beyond the secondary stage, with cell count and quantitative protein, colloidal gold, and Kolmer reaction tests done on all fluid.

The recommended dosage of penicillin for the treatment of primary, secondary, and early latent syphilis is 3 million units. This is given as one injection of 600,000 units per day for five days—in the form of procaine penicillin G, with 2 per cent aluminum monostearate in peanut oil. The recommended dosage for late latent and tertiary lues of all forms is 6 to 10 million units.

Table 1 shows the dosage schedules that have been used in the treatment of secondary syphilis, with an evaluation of the results[15].

Following therapy all patients have a blood serologic test monthly for six months and a spinal tap at the end of six months. After the first six months serologic tests are done every two months for an additional six months and then every four months for a period of four years. If, after a period of four years, there has been no evidence of serologic or clinical relapse, the patient can be considered cured.

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THE PUPILLARY CHANGES ASSOCIATED WITH DIABETIC NEUROPATHY

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The pupillary changes associated with diabetic neuropathy do not seem to be as widely appreciated as many of the other signs and symptoms of the disease. Smith[1], in describing the characteristics of diabetic neuropathy, denied that the pupils or sphincters are affected, and stated that negative findings at these points are important in differentiating diabetic neuropathy from tabes.

Review of 145 Cases

In an effort to determine the frequency and types of pupillary abnormalities associated with diabetic neuropathy, 145 cases of this disease seen at Duke Hospital during the past 10 years have been reviewed. Only those cases in which the same pupillary changes were noted by more than one examiner are included among those showing abnormalities. When this criterion was employed, 12 of the 145 patients were considered to have pupillary abnormalities.

A summary of the significant points about each of the 12 cases in which pupillary changes were described is given in the accompanying chart. The ages varied from 21 to 60 years, but in most instances the diabetic condition was known to have existed for several years. In one case, however, no previous diagnosis of diabetes had been made. Diabetic regulation was poor in all cases. Some patients presented problems in control because of disturbed gastrointestinal motility, with accompanying anorexia, nausea, vomiting, or diarrhea. Treatment with insulin as well as diet was necessary in every case.

In 5 cases, typical diabetic retinal changes were described. Three patients were said to

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Table 1

Case No.	Sex	Age	Known duration of diabetes (years)	Serologic tests for Syphilis	Cerebrospinal Fluid	Evidence of Neuropathy	Retinal Findings (Retinopathy)	Pupillary Changes
1.	F	57	None	Negative	None	Ankle and knee jerks absent. Sensory changes in the feet difficult to interpret because of vascular disease.	No hemorrhages or exudates.	Pupils very small and reacted only slightly to light. No reaction on accommodation. Imperfect dilatation with mydriatics.
2.	M	21	12	Negative	None	Generalized weakness and anorexia; nocturnal diarrhea; abnormal sweating; postural hypotension; disturbed gastrointestinal motility. Position sense absent in feet; light touch perception and vibratory sense (to no. 256 tuning fork) diminished below knees bilaterally. Plantar response downward.	Many small, hard, waxy exudates and punctate hemorrhages.	Pupils small, round, equal; no reaction to light, but constricted on accommodation. Dilated evenly with Neosynephrine.
3.	F	55	15	Negative	Normal findings	Intermittent aching pain in left arm. No. 256 tuning fork, light touch, pin prick not felt over toes. Ankle jerks absent bilaterally.	Many waxy and occasional fluffy exudates. Old and fresh flame-shaped and punctate hemorrhages.	Pupils equal, irregular; reacted slowly to light and then tended to dilate again without true hippus. Reacted well on accommodation.
4.	M	56	2	Kahn positive; Wasserman negative	Pandy 1 plus; Protein 103 mg. per 100 cc. Serology, mastic and microscopic neg.	Vibratory sense (no. 256 fork) absent over toes, and perception of pin prick diminished below mid thighs. Ankle jerks decreased.	Fundi not visualized.	Left pupil was larger than right; both reacted sluggishly to light and on accommodation. Cataracts bilaterally.
5.	M	38	1	Negative	Protein 100 mg. per 100 cc. 4 mononuclear cells per mm.(3) Serology and mastic neg.	Loss of vision in right eye; numbness and tingling of lower extremities. Ankle jerks and knee jerks absent bilaterally.	Scattered hard, waxy exudates and punctate hemorrhages.	Small and irregular pupils without reaction to light or accommodation. Poor response to mydriatics.
6.	M	43	10	Negative	None	Sharp pains in feet for one year; postural hypotension; abnormal sweating; calf tenderness. Perception of pin prick, light touch, and no. 256 tuning fork diminished over feet. Ankle and knee jerks diminished to absent bilaterally.	Fundi not visualized.	Small (1-2 mm.) irregular pupils; sluggish reaction to light and on accommodation.
7.	F	55	2	Negative	None	Six weeks of aching back pain, with radiation to legs. Ankle and knee jerks diminished to absent bilaterally. No demonstrable sensory changes.	No hemorrhages or exudates seen in O.D. O.S. not visualized.	Left pupil small, irregular, and nonreactive. Right pupil not described.
8.	M	47	21	Negative	None	Diarrhea with 8-10 watery stools *q.d.*; postural hypotension; disturbed sweating. Vibratory sense (no. 256 fork), perception of pin prick and light touch decreased below knees bilaterally. Reflexes in legs hypoactive.	Many hard exudates and capillary aneurysms.	Right pupil larger than left. Both reacted sluggishly to light and on accommodation and convergence. At times reaction on accommodation thought to be better than that to light.
9.	M	25	15	Negative	Normal	Dwarfism; disturbed gastrointestinal motility; postural hypotension; disturbed sweating; neuropathic joints. Biceps and triceps reflexes hyperactive. Perception of light touch absent over hands. Hyperesthesia of feet and soles. Ankle and knee jerks absent. Romberg negative. Plantars down.	Fundi not seen well. No hemorrhages or exudates described.	Each pupil about 2 mm. in diameter, somewhat oval, irregular; dilated poorly with shading and mydriatics; reacted fairly well on accommodation. No reaction to light. On several occasions dilation to light was noted.
10.	F	55	16	Negative	Normal fluid and manometrics	Extramedullary cord tumor (meningioma) removed in 1944, with good return of strength to legs. Several years later shooting pains developed in legs and feet. These were thought to be due to diabetic neuropathy rather than recurrence of tumor. Right ankle jerk absent.	No hemorrhages or exudates seen.	Pupils slightly irregular, with left smaller than right. Both reacted to light and on accommodation.
11.	M	33	17	Negative	None	Progressive weakness of lower extremities. Vibratory sense (no. 256 fork) and perception of light touch absent over feet. Right knee and ankle jerks absent, with 1 plus reflexes on left. Atrophy of left leg following poliomyelitis.	Scattered hard exudates and punctate hemorrhages bilaterally.	Pupils irregular; reacted poorly to light and well on accommodation
12.	F	60	25	Negative	Normal	Paresthesias of lower extremities. Vibratory sense (no. 256 fork) decreased over ankles and toes. Knee jerks diminished, ankle jerks absent bilaterally.	Fundi poorly visualized, but no hemorrhages or exudates seen.	Pupils small and fixed to light and on accommodation.

have no hemorrhages or exudates, and in the remaining 4, the fundi could not be visualized clearly.

Since pupillary abnormalities are frequently associated with neurosyphilis, particular attention was given to the past history and to the results of serologic studies on the blood and spinal fluid. Of these 12 patients, only 2 had a history of syphilis, inadequately treated in each case. Both patients had negative spinal fluid serology, although in one the peripheral blood gave a weakly positive reaction. The spinal fluid of these 2 patients showed an abnormally high protein content. Examination of the spinal fluid in 4 other cases revealed no abnormalities.

The pupillary changes varied considerably. Only 1 patient (case 9) presented all the changes characteristic of classic Argyll Robertson pupils. However, cases 2 and 11 fulfill all the criteria except one. The former showed a normal response to mydriatics, and in the latter this reaction was not tested. Six other patients had miotic pupils which failed to react, or reacted abnormally, to light and accommodation. Two of these had imperfect pupillary dilation when tested with mydriatics.

Reports in the Literature

Similar abnormalities in pupillary size and reactions associated with diabetic neuropathy have been described by Rundles[2]. He reported that abnormal pupillary responses were present in one-fourth of a group of 25 diabetic patients with neuropathy which he studied. Two of these patients had Argyll Robertson pupils without any history or findings to suggest syphilis. The majority had miotic pupils which reacted sluggishly to light. Waite and Beetham[3] reported similar changes in a large group of diabetic patients in which they studied the incidence of ocular changes found in diabetes. Jordan[4] collected 23 cases of diabetic neuropathy with pupillary abnormalities. Five of these had typical Argyll Robertson pupils, again without any history or findings to suggest syphilis.

Conclusion

From the study herein reported and the review of others' observations, it is evident that a variety of changes in pupillary size and reactions may occur in diabetic neuropathy. Not infrequently, typical Argyll Robertson pupils are seen, in the absence of any other clinical or laboratory evidence of neurosyphilis. More care in examining the pupils and in looking for the characteristic fundal changes in diabetic patients would probably reveal an even greater incidence of minor ocular changes in the course of diabetic neuropathy. It should also be pointed out that the presence of Argyll Robertson pupils and the absence of knee jerks and ankle jerks cannot be taken as unequivocal evidence of neurosyphilis, since such a combination may occur in diabetic neuropathy.

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DIAGNOSIS OF TUMORS OF THE UTERINE CANAL

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The method of diagnosing tumors of the uterine canal which is described here is a combination of hysterographic studies and, if these contain a filling defect, direct inspection by hysteroscope.

In patients with irregular uterine bleeding, roentgen studies are always made before a hysteroscopic examination is done. If the roentgen study is negative, a hysteroscopic examination, or direct visualization of the uterine canal, is unnecessary. If there is a filling defect, however, diagnosis can be made by direct examination with the hysteroscope.

Hysterographic Studies

Our plan for making x-ray studies of the uterine canal is as follows:

If the patient has only a moderate amount of bleeding, the hysterogram can be made at once. If there is profuse bleeding, however, it is preferable that the patient have Testosterone for several days prior to the study. The patient is brought to the x-ray room with no preliminary medication, put in the lithotomy position, and covered with sterile drapes, after which the vaginal vault is well cleansed with soap and water and

From the Section on Surgery, Medical Society of the State of North Carolina, Pinehurst, May 9, 1951.

two applications of merthiolate. Sterile gown and gloves are used by the operator for the rest of the procedure.

The vaginal speculum is inserted into the vagina. When it has been properly placed and the cervix is in full view, a small probe is passed into the cervical canal to get the direction of the canal. If it is not markedly constricted, then the uterine cannula, which has a plastic tip, is inserted into the uterine canal, usually with little difficulty, and the dye is injected through the cannula into the canal. An aqueous dye is preferable to an oil dye, as the latter has been found to overshadow pathologic findings in the x-ray studies. From 5 to 7 cc. is the amount of dye usually used. If, however, the patient complains of the slightest discomfort before this amount has been instilled, the injection is stopped immediately.

With the uterine cannula in place following injection of the dye, an x-ray film is made. A second exposure is made after the uterine cannula has been withdrawn and the dye allowed partially to drain out of the canal into the vaginal vault. Following this procedure some patients complain of pain, which is usually remedied by the administration of 32 mg. (½ grain) of codeine. If there is any filling defect in either of the two films, the patient is then advised to have a hysteroscopic examination.

It is not possible to rely entirely on roentgen examination of the uterine canal to determine what type of tumor is present, or whether any tumor is present at all. The main object of the hysterogram is to see whether or not there is a filling defect. The filling defects, if there are any, resemble each other so closely that it is impossible to identify the condition from roentgen studies alone. For instance, a filling defect simulating a polyp will often be found to be a mass of endometrial hyperplasia; or a filling defect simulating a submucosal myoma may be a mass of endometrial hyperplasia. At times small ragged filling defects situated particularly at the cornu of the uterus may be suggestive of endometrial carcinoma. However, x-ray studies prior to a hysteroscopic examination are invaluable in finding the exact area where the lesion is probably located.

Hysteroscopic Examination

The hysteroscope is an instrument with a forward view Fontar lens system, which largely prevents glare and reflection of light. This lens system is encased in a removable outer metal sheath, which is inserted into the uterine canal before the lens system is inserted. In conjunction with the lens system is a channel for the return flow of water, for the taking of biopsy specimens under direct vision, and for the fulguration of small polyps and masses of endometrium. It has been found that this type of hysteroscope—by which water flows in one entrance and out over the distal lens, bathes the uterine canal, and returns through another outlet—is superior to other types that we have used experimentally. No other lens system that we have used obtains as wide a scope of vision as the direct forward vision system.

Preparation of the patient for hysteroscopic examination is quite similar to the routine vaginal preparation for vaginal surgery. The patient is given an opiate with atropine one-half hour before the administration of Sodium Pentothal, which in itself usually provides sufficient anesthesia for the examination. In the operating room (the patient having been shaved previously), the vaginal vault is scrubbed well with soap and water, and painted with two applications of merthiolate. Sterile drapes are applied and, under aseptic conditions similar to those maintained in vaginal surgery, a speculum is inserted into the vaginal vault. The cervix is brought into view and, by means of a tenaculum applied to the upper lip, is drawn downward, following which a small uterine probe is used to get the direction of the canal.

Previous to this, however, it is important to determine whether there is any partial fixation of the fundus of the uterus, or whether any masses can be palpated in the adnexae. If the uterus is fixed posteriorly, for instance, it is probably best not to attempt a hysteroscopic examination. If, however, the uterus is freely movable, it is well dilated (following insertion of the uterine probe to get the direction of the cervical canal) with Goodell dilators, as for curettage. The outer sheath of the hysteroscope, with obturator similar to a urethroscope, is then inserted into the canal, past the internal os. The obturator is then removed, and the lens system, together with the built-in channel for water inflow and return, is inserted into this outer sheath. The connections for the inflow and outflow of water are made, and the light attachment is connected. Water

is allowed to run in at a moderate rate, the container being only slightly above the level of the patient.

The outflow may be facilitated by a very slight suction or by siphonage supplied by a container of water on the opposite side of the table. It is important to avoid strong suction, as this will tend to increase uterine bleeding. After the water is allowed to run out for a period of a few seconds, the outflow is cut off entirely and a view of the cervical canal may be obtained. It is probably best that under direct vision the hysteroscope be carried to the fundus for examination of the fundus and cornu first. After this area has been studied, the hysteroscope is gradually and slowly withdrawn towards the cervical canal. Any tumors that may be present in the canal will then fall into view.

The water should be lukewarm and preferably distilled, if photography is desired.

With practice, the various patterns of a normal endometrium will be recognized. At first, however, under the magnification of the lens system, the endometrium, being floated up by the continuous flow of water, will give the appearance of a pathologic condition, such as general carcinoma of the uterine canal. Repeated hysteroscopic examination of various patients, however, will enable the examiner to recognize normal endometrium or hyperplasia. Also, it will be found that light reflections occasionally occur, giving some areas of the uterine canal a greyish-white appearance which disappears when the hysteroscope is shifted. When hyperplasia of the endometrium is present, long strands of endometrium will float in the water. If, however, that same specimen were removed for some reason, it would be very difficult to find the hypertrophy of the endometrium as seen in the living patient, because the water tends to lift up and float small portions of endometrium or growths of any description.

Following inspection of the uterine canal, there being no growth present but probably filling defects caused by hyperplasia, the hysteroscope is withdrawn towards the cervical canal. A cervical canal which appears very white through the hysteroscope is studied for pathologic lesions. If a biopsy is desired, a biopsy-taker is inserted through the channel and a specimen may be taken with accuracy under direct vision from any area of the uterine canal.

If a hysteroscopic examination is made following an ordinary dilation and curettage of the uterus, it will be found that the curette has missed a surprising number of areas, leaving patches of hyperplasia of the endometrium. Since the hysteroscopic examination is a relatively simple procedure, it would seem best to do one after each curettage in order to be certain that all pathologic growth has been removed.

Types of Growths

Polyps of the uterine canal appear in various sizes, from very small endometrial polyps to some that fill the greater portion of the uterine canal. The small polyps will be found to float in the water with a fairly narrow pedicle; however, at times the opposite may be found in a fairly short polyp with a wide base. These polyps, which can cause much spotting and even fairly profuse bleeding, may occur in any portion of the uterine canal, or even in the cervical canal. So often missed by the curette, they may be safely and easily fulgurated under direct vision by carrying the fulguration tip through the channel of the hysteroscope, thus avoiding major surgery.

The submucosal myomas give a much wider filling defect in the original hysterogram. As previously stated, however, they can simulate defects caused by endometrial hyperplasia. Submucosal myomas may be an active cause of uterine bleeding, even though the pelvic examination done previously may have been entirely negative for any fibroids on the serosal surface. It is doubtful whether serosal fibroids that are palpated upon examination of the serosal surface and that do not protrude into the uterine canal are the cause of uterine bleeding. If the patient who is found to have palpable serosal fibroids upon vaginal examination has an entirely normal hysterogram, another reason for the uterine bleeding should be sought.

Endometrial carcinoma, which responds so well to surgery if detected early, may be diagnosed with the hysteroscope and confirmed, if necessary, with a biopsy under direct vision. Endometrial carcinoma often begins as a small protruding mass near the cornu. Although it may also be a diffuse carcinomatous growth involving the uterine canal, invariably it will protrude through the internal os into the cervical canal. In contrast to carcinoma, extensive endometrial hyperplasia resembling carcinoma of the

uterine canal will be found to stop abruptly at the internal os.

Conclusion

The above method of roentgen study and direct examination by hysteroscope has the advantage of greater simplicity and accuracy over usual methods of currettage to detect benign growths, and the various vaginal stains or suction biopsies to detect carcinomatous growths.

THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JEREMIAH BATTLE*

DOROTHY LONG

LEXINGTON, KENTUCKY

In very nearly the same time and place as Dr. Calvin Jones, Dr. Jeremiah Battle was a physician of prominence, practicing first in Tarboro and later in Raleigh. He had matriculated, but did not graduate, with the class of 1802 at the University of North Carolina. He was well known in the locality as a capable physician, and some of his professional qualities are shown in the records of his case book, which was once owned by Dr. Hubert A. Royster and described by him in an article written a few years ago for the *Annals of Medical History.*

The most extensive account of a case is that of a Mr. Woolworth of Philadelphia, which Dr. Royster, 122 years later, diagnosed as typhoid, and for which Dr. Battle used the treatment common for fevers at that period—repeated blood-letting, diuretics, wine, opiates, and so forth. Apparently he knew when to stop the bleeding, however, for he notes in this case that when he saw his patient's "flesh go so fast," he stopped the bleeding for three weeks, and then did it only once more, upon the patient's request and against his own remonstrance. Dr. Battle, in addition to the usual treatment, used other more modern procedures, including therapeutic baths and a dietetic regimen which is still quite acceptable. Dr. Royster suggests that he may have known of the use of bathing in fevers from the writings of William Cullen (1712-1790) of Scotland. Noticeable in Dr. Battle's notes, according to Dr. Royster, are his humor, his frankness, a belief in his remedies, and a deep interest in his patients[1].

Another of Dr. Battle's writings which has survived is a history of Edgecombe County, sent in June, 1812, to the *Star*, the newspaper of which Dr. Calvin Jones was part owner. In this article, Dr. Battle mentioned the doctors of his county, not very favorably, writing: "There are more physicians than at any former period; who cannot boast, however, of any great erudition. Quacks are abundant, and are privileged to boast."[2]

He also includes some description of the diseases prevalent in his section, mentioning especially "Bilious fevers, Cholera Infantum," and a "Malignant double tertian" fever. "By this time," he wrote, "physicians had multiplied in proportion to the diseases, and these Bilious fevers were attacked by Emetics, Cathartics, and the Bark, & in addition to these some cooling or sweating medicines were exhibited during the hot stage. In some cases the Lancet was unknown here!"[3]

Dr. Battle added to his article a description of an epidemic of this fever in Scotland Neck, from notes made by his friend, Dr. S. J. Baker, which in addition to describing symptoms and treatments, included an account of a dissection performed on a Negro man who had died of the fever[4].

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* The second of two sketches of early North Carolina physicians.

Do the military forces need as many physicians as they demand, even in time of war? In the last war, one out of every three physicians was called to duty, a far greater percentage than any other professional, business, or working group was called upon to furnish. In many instances these men waited interminably, assigned to specific units which took months to build up. Professionally these doctors got rusty; socially they got bored; economically they got deprived of their normal standard of living while serving as so many "bodies" in a table of organization. Wouldn't it have been better to have had pools of available physicians for assignment to the various theaters of war and to draw upon these pools as medical officers were needed? — Editorial, California M. 73:444 (Nov.) 1950.

North Carolina Medical Journal

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Publication office: Carmichael Printing Co., 118 West Third Street, Winston-Salem 1, N. C.

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DECEMBER, 1951

NORTH CAROLINA'S DIPHTHERIA RATE

The recently released 1950 diphtheria rates for the various states show that North Carolina has the unenviable distinction of having the highest rate in the Union. This record is made more embarrassing by the fact that North Carolina was the first state in the Union to adopt a compulsory diphtheria vaccination law. Unfortunately, "passing a law" does not always remedy a situation; and the law requiring infants to be vaccinated within the first year of life was most difficult to enforce. Smallpox vaccination was made a requirement for admission to our public schools, hence was generally practiced—but seldom, until recently, before the sixth year of life, which marked the legal age limit for admission to the first grade of school.

The answer to our problem is one of public education to the danger of diphtheria and the effectiveness of vaccination against it. This education is the joint responsibility of the public health officials and the private physicians—especially the pediatricians and the family doctors. As Dr. John Bender said in the November issue of this journal: "The general practitioner should devote his time and energies to such commonplace diseases as whooping cough, diphtheria, scarlet fever, and measles . . . Intelligent parents are as anxious as public health authorities to have their children actively immunized against the common infections. Failure to have this done places the blame squarely on the shoulders of the family physician."[1]

It is to be hoped that every family doctor who reads this journal will read Dr. Norton's letter on page 613 of this issue, and will resolve to see that every child under his care will be given the protection afforded by the timely use of the effective immunizing agents available.

1. Bender, J. W.: Pediatrics and General Practice, North Carolina M. J. 12:540 (Nov.) 1951.

* * *

NO FELLOWSHIP DUES FOR THE A.M.A.

Until the House of Delegates of the American Medical Association voted two years ago to establish annual dues of $25, the only requirement for membership in that organization was to be a member in good standing of one's state medical society. The county society was considered the unit of membership in the parent organization. In order to take part in the scientific sessions of the A.M.A. and to get the *Journal of the American Medical Association*, it was necessary to pay fellowship dues of $12. After membership dues were voted by the House of Delegates, the fellowship dues were reduced to $2.00 for 1951, then raised to $5.00 for 1951. The distinction between a fellow and a member of the A.M.A. was confusing, and gave rise to much grumbling—not so much because of the money involved as the nuisance of having to pay separate dues. It will be good news to many that the Board of Trustees of the A.M.A. has decided to abolish the fellowship dues for 1952 and to recognize only one class of membership in the Association, which is covered by a single payment.

* * *

STATE MEDICAL JOURNAL CONFERENCE

Last year, for the first time since the memory of many a man runneth not to the contrary, the American Medical Association did not play host at its headquarters to the Annual Conference of State Secretaries and Editors. This year, on Monday and Tuesday, November 12 and 13, this conference was resumed, but the secretaries who were not editors or business managers of state journals were left out of the party. Morning and afternoon sessions were held on both days, and a dinner was given Monday evening at the Bismarck Hotel.

The program was arranged by members of the Advisory Committee of the State Journal Advertising Bureau. It is hard to single out its best features, for it was all good. Among the high lights were: "The Job of an Editor," by Mr. Walter Kahoe, director, Medical Department, J. B. Lippincott Company, followed by a panel discussion. "Literary Aspects of Medical Journalism," by Mr. Harry L. Shaw, general editor, Harper and Brothers; "Socio-Economic Medical Articles," by Mr. William Alan Richardson, editor, *Medical Economics;* and "Medical Writings as Observed by a Reader," by Dr. Roger I. Lee of Boston, a former president of the A.M.A. A very profitable part of each session, both morning and afternoon, was the question and answer period. The after dinner speaker was Wu Paak Shing, Ph.D., who spoke on "The Chinese Under the Communists' Rule."

The conference was a stimulating experience for all who attended. All the speakers were authorities in their field, and they all knew how to make their advice palatable. Mr. Kahoe, for example, said that some of the best work of editors was not seen by readers, since it consisted in "killing off" unacceptable material. He struck a responsive chord when he spoke of "the writer who will not use 100 words when 500 will express his idea almost as well." Dr. Wallace Yater, editor of the *Medical Annals of the District of Columbia,* said that the main job of an editor was fourfold: To get people to do his work for him; to find and select material; to develop new ideas; and to appease authors.

Mr. Shaw began by saying that the literary aspects of medical journalism were virtually non-existent. He said that doctors needed to write more simply; to be more concrete; to give more specific instances; and not to write too quickly. "There is no such thing as good writing," he said; "there is only good re-writing."

Dr. Lee, like the other speakers, favored "clear and understandable English." He thought that many articles in the special journals were entirely too long and too clothed in the jargon of the specialty. He deplored the lack of clinical judgment shown in the interpretation of statistics, and stressed the need of a discriminating mind in writing.

All the speakers agreed that medical writing should be as simple and as clear as possible. Most of them agreed that editorials might and should deal with political subjects, but should not be partisan.

It was gratifying to learn that in the ratio of reading to advertising space the NORTH CAROLINA MEDICAL JOURNAL, with a ratio of 7 to 4, was second only to the *Pennsylvania Medical Journal's* 8 to 4. The national average was 5 to 4. It was also gratifying to learn that our state journal has had its share of advertising, and that its financial showing compared favorably with the other state journals. For this our business manager, Mr. James T. Barnes, deserves much of the credit.

* * *

CAROLINA HOTEL RESERVATIONS

On page 613 of this issue will be found a letter to Mr. J. T. Barnes from Mr. William Fitzgibbon, manager of The Carolina Hotel at Pinehurst. The letter is self explanatory—but attention is called to it editorially, in order that those who are unable to secure reservations at The Carolina may understand the situation. The unprecedented number of requests for accommmodations must presage a record-breaking attendance for the 1952 annual meeting of the Medical Society of the State of North Carolina. It is good to know that sufficient space will be available in other hotels or cottages in Pinehurst to accommodate all who plan to attend.

* * *

Microfilmed copies of the NORTH CAROLINA MEDICAL JOURNAL are available and may be ordered from University Microfilms, 312 North First Street, Ann Arbor, Michigan.

CORRESPONDENCE

To the Editor:

When the 1950 diphtheria rates for the various states became available recently, the distressing fact was revealed that North Carolina had the highest rate in the nation.

This is an unenviable position in normal times and is particularly alarming at this time when extensive movements of our population are taking place and overcrowding is increased.

Every private physician has a responsibility to the infants and children under his care to advise immunization. Use of diphtheria and tetanus toxoids combined with pertussis vaccine offers a simplified method of immunization against all three of these diseases simultaneously.

Health departments have been requested to expand their health education programs relative to immunization and to establish a follow-up service in cooperation with local physicians so that parents of all infants reaching three months of age can be notified to have their children immunized, and can be re-notified if necessary.

J. W. R. Norton, M.D.
Secretary and State Health Officer
N. C. State Board of Health

* * *

To the Editor:

We are enclosing an opinion handed down by Circuit Judge Thomas J. Landers of Gogebic County in *litigation between a chiropractor and the Trustees of Grandview Hospital, Ironwood, Michigan.*

Criminal charges were pressed by the chiropractor who claimed that the Trustees discriminated against him and wilfully neglected to perform duties while holding positions of public trust when they refused him the use of Grandview Hospital for his chiropractic practice.

Here are the salient points of Judge Landers' decision:

1. . . . "a public officer cannot be subjected to criminal prosecution for failure to perform duties which require the exercise of discretion on his part, where there is no element of an evil or corrupt design in his conduct."

2. The chiropractor "claims to be a practitioner of a school of medicine, . . . but we are referred to no statute or case where the legislature or a Michigan court has ever defined the meaning of the term 'school of medicine'."

3. . . . "To uphold the informations and force the defendants to trial in these cases would be legislating that the term 'school of medicine' included a school where chiropractic was taught."

4. Under the terms of Act 350, Public Acts of 1913, the Board of Trustees were given the authority to determine rules for the hospital. The rules state that no person shall practice medicine in the hospital unless he has a license from the state of Michigan to practice medicine.

5. Charges against the trustees were dismissed.

We are inviting this decision to your attention because you may wish to report on it in your good journal.

L. Fernald Foster, M.D., Secretary,
Michigan State Medical Society

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Mr. James T. Barnes, Executive Secretary
Medical Society of the State of N. C.
Raleigh, N. C.

Dear Mr. Barnes:

As we have been receiving a series of critical letters from various members of your Society, due to the fact that we have not been able to promise them reservations in The Carolina, I feel that it is only fair to them and to the Hotel, to try to explain the situation clearly.

Immediately after you released the announcement of the meeting, the applications came pouring in and within two days we had over 700 applications for accommodations. The Carolina, as you know, can only accommodate 450 and from that you can readily understand that a great many of your members will have to live in nearby hotels in Pinehurst who are cooperating with us. So far as we can see now, everyone will be taken care of in Pinehurst hotels or nearby cottages.

We realize that everyone wants to be at The Carolina but it is just impossible. The reservations have been treated as fairly as possible and we ask that your members will understand the situation and bear with us. There will of course be some cancellations before May and these will be allocated to members whose names appear on our waiting list and will be taken in strict rotation.

William J. Fitzgibbon, Manager
The Carolina

BULLETIN BOARD

News Notes from the University of North Carolina School of Medicine

Dr. Thomas C. Butler, professor of pharmacology, served as chairman of a symposium on the theories of anesthesia at the Postgraduate Assembly in Anesthesiology in New York City on December 6.

* * *

Dr. Nathan A. Womack, professor of surgery, gave a paper on "Endocrine Relationships in Benign Lesions of the Breast" before the Southern Surgical Association in Hot Springs, Virginia, on December 5. On December 12 he spoke to the First District Medical Society, meeting in Elizabeth City, on "The Extension of Surgery in the Treatment of Cancer."

* * *

Dr. Geoffrey W. Harris, of the Physiological Laboratory, Cambridge, England, gave the first Medical Foundation lecture on November 19; his topic was "Neuro-Endocrine Relations."

* * *

Postgraduate medical courses sponsored by the University School of Medicine and the Extension Division have been arranged at New Bern-Morehead City, Ahoskie-Edenton-Elizabeth City, and Raleigh, with the county medical societies as co-sponsors. The programs are as follows:

New Bern-Morehead City

January 15—
4:00 p.m. Office Gynecology
7:30 p.m. Emergencies in Obstetric Practice—
Dr.. William F. Mengert, Southwestern Medical School, Dallas

January 22—Speaker and topics to be announced.

January 29—
4:00 p.m. Prophylaxis and Treatment of Acute Infections
7:30 p.m. Infant Feeding
Humidification in Pediatrics
Dr. Samuel F. Ravenel, Greensboro

February 5—
4:00 p.m. Jaundice
7:30 p.m. Acute Abdominal Emergencies
Dr. Philip Thorek, Chicago

February 12—No meeting. Week of Watts Symposium.

February 19—Speaker and topics to be announced.

February 26—
4:00 p.m. Common Foot Problems
7:30 p.m. The Knee Joint
Dr. Allen F. Voshell, Baltimore

Ahoskie-Edenton-Elizabeth City

January 16—
4:00 p.m. Office Gynecology
7:30 p.m. Emergencies in Obstetric Practice
Dr. William F. Mengert, Southwestern Medical School, Dallas

January 23—Speaker and topics to be announced.

January 30—
4:00 p.m. Acute Infections
Acute Hemorrhagic Nephritis
7:30 p.m. Infant Feeding
Humidification in Pediatrics
Dr. Samuel F. Ravenel, Greensboro

February 6—
4:00 p.m. Jaundice
7:30 p.m. Acute Abdominal Emergencies
Dr. Philip Thorek, Chicago

February 13—No meeting. Week of Watts Symposium.

February 20—Speaker and topics to be announced.

February 27—
4:00 p.m. Common Foot Problems
7:30 p.m. The Knee Joint
Dr. Allen F. Voshell, Baltimore

Raleigh

January 17—
4:00 p.m. Lesions of the Vulva
7:30 p.m. Maternal and Neonatal Care
Dr. John L. Parks, George Washington University School of Medicine, Washington

January 24—
4:00 p.m. The Clinical Importance of the RH Factor
7:30 p.m. Newer Treatment of Certain Digestive Disorders
Dr. Louis K. Diamond, Harvard Medical School, Boston

January 31—Virus Diseases
4:00 p.m. Topic to be announced
7:30 p.m. Topic to be announced
Dr. Hobart A. Reimann, Jefferson Hospital, Philadelphia

February 7—
4:00 p.m. Physiological Deformities in Children
7:30 p.m. Brachialgia
Dr. Sylvester J. O'Connor, University of Michigan Hospital, Ann Arbor

February 14—No meeting. Week of Watts Symposium.

February 21—
4:00 p.m. Important Clinical Points in Anesthesiology
7:30 p.m. The Importance of Blood Volume Studies in the Management of Surgical Patients
Dr. Morris J. Nicholson, The Lahey Clinic, Boston

February 28—
4:00 p.m. Physiology of Body Fluids
7:30 p.m. The Clinical Aspects of Fluid Balance
Dr. Carl A. Moyer, Washington University School of Medicine, Saint Louis

News Notes from the Duke University School of Medicine

Duke Hospital patients this week began reading their favorite novels off the ceiling. A newly-acquired "ceiling reader" installed recently by the Duke Hospital Women's Auxiliary projects book pages on the ceiling above the bed, and a push-button enables patients to turn pages easily and quickly.

The machine, smaller than a portable typewriter, is placed on the floor, is plugged in, and the pages are projected onto the ceiling. The film-book, on a spool like a typewriter ribbon, can be turned forward or backward by the push-button.

Along with the machine, the Duke Auxiliary, as a starter for a library, ordered a dozen book-films ranging from "Little Black Sambo" for the children to "Mail Call" for adults. There is one on handicraft for the handicapped.

News Notes from the Bowman Gray School of Medicine of Wake Forest College

Dr. Coy C. Carpenter was honored by the faculty of the Bowman Gray School of Medicine of Wake Forest College on November 28, on the occasion of the unveiling of his portrait. The portrait, painted

by Leopold Seyffert, Jr., of New York, was prepared on commission of the faculty of the medical school to honor Dr. Carpenter for his fifteen years' service as dean.

Dr. Carpenter joined the faculty of the two year School of Medical Sciences, located at Wake Forest, North Carolina, and ten years later succeeded Dr. Thurman D. Kitchin as its dean. He was still serving in that capacity in 1941, when the medical school was expanded to a four year medical college and removed to Winston-Salem under the name of the Bowman Gray School of Medicine of Wake Forest College.

The inscription on the plaque reads: "Coy Cornelius Carpenter, M.D. Portrait presented by the Faculty of the Bowman Gray School of Medicine of Wake Forest College in acknowledgment of his contribution to the advancement of the College and its Medical School."

Dr. Paul Whitaker, of Kinston, who served as toastmaster at the banquet, followed the growth of the institution, recognizing the contribution to the institution by the faculty. Dr. Wingate Johnson, professor of clinical internal medicine at the institution, speaking for the faculty, presented the portrait to the college, saying, "It is altogether fitting that Dr. Carpenter's portrait should be next in the gallery, since he, more than anyone else, is responsible for the respectable place that Bowman Gray occupies in the field of medical education." Dr. Harold W. Tribble, president of Wake Forest College, accepted the portrait on behalf of the college, and praised the achievements of the school, declaring, "What has been accomplished at our medical school is due more to the fortitude, courage, and ability of the dean than to any other person."

The portrait hangs in the lobby of the medical school building, with that of the late Bowman Gray, for whom the school is named and whose financial assistances made possible the expansion and removal of the two-year medical school to Winston-Salem. The portrait of Mr. Odus M. Mull, who was instrumental in the move, hangs in the library of the medical school.

* * *

Dean Carpenter has recently announced the appointment of Dr. Parker R. Beamer as associate dean. Dr. Beamer will continue to serve in the capacity of professor and director of the Department of Microbiology, the position to which he was appointed in 1948. As associate dean, Dr. Beamer will serve as chairman of the Admissions Committee, in addition to matters of curriculum, education, and student activities.

Ecusta Paper Corporation Medical Center

Members of the Transylvania County Medical Society were guests of honor at the open house and dedication of the new medical center of Ecusta Paper Corporation at Pisgah Forest, North Carolina. Dr. G. H. Gehrmann, medical director of E. I. du Pont de Nemours and Company, introduced the principal speaker, Dr. Edward C. Holmblad, managing director and treasurer of the Industrial Medical Association. Dr. W. R. Berryhill brought greetings from the University of North Carolina School of Medicine; Dr. Haywood Taylor, from the Duke University School of Medicine, and Dr. George T. Harrell, from the Bowman Gray School of Medicine of Wake Forest College.

The medical center was formally presented to the medical department staff by John W. Hanes, president of Ecusta Paper Corporation, and accepted by Dr. Mac Roy Gasque, medical director.

North Carolina Tuberculosis Association

At ground-breaking ceremonies held at the University of North Carolina recently, the fourth of the state's tuberculosis hospitals was formally begun. The proposed $1,100,100 sanatorium, a part of the $10,000,000 State Health Center being established at Chapel Hill, will be administered by the State Sanatorium Board.

The building is named for L. Lee Gravely and the late Mrs. Gravely. Gravely, a Rocky Mount business man and legislator, is chairman of the board of directors. He has for years kept the need for greater and better treatment facilities before the state legislators to the extent that each appropriation has meant to some a "Gravely Victory."

Other persons appearing on the program were William D. Carmichael, Jr., vice-president and comptroller of the consolidated University; Dr. H. S. Willis, superintendent of the North Carolina Tuberculosis Sanatoria; the Rev. W. M. Howard, Jr., pastor of the University Methodist Church, and the Rev. Carlos P. Womack, Chaplain, McCain Sanatorium. Frank W. Webster of NCTA was present at the ceremony.

Fifth District Medical Society

The Fifth District Medical Society held its annual fall meeting at the North Carolina Sanatorium, McCain, on November 15, 1951. Scientific papers were given by Dr. Nathan A. Womack, Dr. Charles H. Burnette, Dr. W. C. Sealy, and Dr. J. L. Callaway. The president-elect for the next year is Dr. R. L. Murray, Raeford, vice-president-elect Dr. Claude Milham, Hamlet, and re-elected secretary-treasurer, Dr. J. S. Hiatt, Jr., McCain. Dr. Hiatt was also elected counselor for the Fifth District, and Dr. Robert McMillan, Southern Pines, North Carolina alternate counselor.

Incoming president of the society is Dr. William F. Hollister, who succeeds Dr. L. R. Doffermyre.

Seventh District Medical Society

The Seventh District Medical Society held a meeting at Monroe, North Carolina, on November 28. In the absence of Dr. C. H. Pugh, president, Dr. Clem Ham presided.

Subjects and speakers for the afternoon session were: "Ruptured Appendix—A Review of 85 Cases Surgically Treated," Dr. Francis B. Lee, Monroe; "Experience with the North American Male Frog Test," Dr. W. M. Smethie, Wadesboro; "Case Report—Massive Tumor of Parotid Gland," Dr. Joseph F. Patterson, Albemarle; "A Layman's Experience with a Colostomy," Stanley Z. Pollock, Lincolnton; "Diagnosis and Treatment of Upper Gastrointestinal Condition," Dr. Colin Munroe, Charlotte.

Dr. Frederic C. Hubbard, president of the State Medical Society, addressed the evening session, followed by a scientific address, "The Management of Erythroblastosis Fetalis," by Dr. J. Buren Sidbury of Wilmington.

Newly elected officers of the society are Dr. Clem Ham, Monroe, president; Dr. James F. Reinhardt, Lincolnton, vice president; Dr. Edward S. Bivens, Albemarle, secretary.

Carteret County Medical Society

The Carteret County Medical Society held its regular monthly meeting at the Morehead City Hospital Monday night, November 12. This was a dinner meeting, the hospital acting as host. Dr. C. S. Maxwell, president, presided.

There was no formal scientific paper presented,

but several matters of general interest were discussed. Among them were the matter of a postgraduate medical course to be held in New Bern in January and February, and the Sunday emergency medical and surgical service. The postgraduate medical course is a part of the general extension work of the State University Medical School, and will be sponsored jointly by the Carteret and Craven Medical Societies.

A year round Sunday emergency medical and surgical service is being provided by the physicians of the county on a rotating basis, in order that such service may be promptly available in all Sunday emergencies, through the Morehead City Hospital.

Dr. P. T. Myers, radiologist, of Kinston, who has been employed for the past two or three years by the Morehead City Hospital to interpret x-ray films, resigned as of December 1, stating that he was returning to his native state, Iowa.

Dr. N. Thomas Ennett, Carteret County health officer, called attention to the schedule of the state x-ray trailer, which was to be in the county November 27-30, in the interest of tuberculosis control. The trailer was secured through Dr. W. A. Smith, director of the Tuberculosis Division of the State Board of Health.

Dr. Grady C. Cooke of Morehead City, formerly of Winston-Salem, was received into membership of the Carteret County Medical Society.

Visitors were Drs. Barefoot and Nance of Havelock, North Carolina.

N. THOMAS ENNETT, M.D.,
Corresponding Secretary

News Notes

Dr. Charles M. Howell, Jr., has announced the opening of offices in Winston-Salem. Practice will be limited to allergy and dermatology.

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Dr. G. Aubrey Hawes and Dr. Cecil J. Hawes have announced the removal of their offices to the Hawes Clinic, 1333 Romany Road, Charlotte.

Mississippi Valley Medical Society 1952 Essay Contest

The twelfth annual essay contest of the Mississippi Valley Medical Society will be held in 1952. The Society will offer a cash prize of $200, a gold medal, and a certificate of award for the best unpublished essay on any subject of general medical interest (including medical economics and education) and practical value to the general practitioner of medicine. Certificates of merit may also be granted to the physicians whose essays are rated second and third best. Contestants must be members of the American Medical Association, and residents and citizens of the United States. The winner will be invited to present his contribution before the seventeenth annual meeting of the Mississippi Valley Medical Society to be held in St. Louis, Missouri, October 1, 2, 3, 1952, the Society reserving the exclusive right to first publish the essay in its official publication — the **Mississippi Valley Medical Journal** (incorporating the **Radiologic Review**). All contributions shall be typewritten in English in manuscript form, submitted in five copies, not to exceed 5,000 words, and must be received not later than May 1, 1952. The winning essays in the 1950 contest appear in the January 1951 issue of the **Mississippi Valley Medical Journal** (Quincy, Illinois.)

HAROLD SWANBERG, M.D., Secretary

American Medical Association

The forty-eighth annual Congress on Medical Education and Licensure will be held February 10-12, 1952, at the Palmer House in Chicago.

The congress is conducted under the auspices of the Council on Medical Education and Hospitals of the American Medical Association and the Federation of State Medical Boards of the United States.

The program will follow the general pattern of previous years, except that the Federation will hold a business meeting Sunday afternoon, February 10, and will not schedule a scientific program for Tuesday afternoon, February 12.

An open meeting of the Advisory Board for Medical Specialties will be held on Sunday, February 10, immediately preceding the Congress.

It is important to refer to the Annual Congress on Medical Education and Licensure when writing to the Palmer House for reservations.

American College of Surgeons

At the annual meeting of the Governors and Fellows of the American College of Surgeons held in the Civic Auditorium in San Francisco on Thursday afternoon, November 8, 1951, the following officers were elected for the term 1952-53: president-elect: Harold L. Foss, M.D., Danville, Pennsylvania; first vice president: Robert H. Kennedy, M.D., New York; second vice president: Thomas F. Mullen, M.D., San Francisco.

These officers will be installed at the 1952 Clinical Congress in New York on September 22.

* * *

Nine-hundred and three initiates were received into fellowship and three honorary fellowships were conferred by the American College of Surgeons at the Convocation on Friday evening, November 9, which was the closing session of the thirty-seventh annual Clinical Congress in San Francisco. The fellowships were conferred by Dr. Alton Ochsner of New Orleans, president of the College. The fellowship address was delivered by Dr. J. Roscoe Miller, of Chicago, president of Northwestern University.

The following initiates from North Carolina were received into fellowship:

Kyle E. Black, Salisbury; Harold J. Bradley, Greensboro; Guy H. Branaman, Jr., Raleigh; Julian C. Brantley, Jr., Rocky Mount; Jesse B. Caldwell, Jr., Gastonia; Ronald E. Crissey, Elizabeth City; Everette J. Dunning, Charlotte; W. Russel Floyd, Concord; Walter S. Hunt, Jr., Raleigh; C. Hal Ingram, High Point; Michael F. Keleher, Asheville; Charles E. Kernodle, Jr., Burlington; John R. Kernodle, Burlington; Robert H. LeGrand, Greensboro; J. Kingsley MacDonald, Charlotte; James B. Martin, Burlington; L. Thomas Morton, Lincolnton; Richard T. Myers, Winston-Salem; Jack H. Neese, Elon College; Hubert M. Poteat, Jr., Smithfield; C. Lowry Pressly, Charlotte; Henry D. Severn, Asheville; Kenneth S. Tanner, Jr., Rutherfordton; Joseph M. Walker, Jr., Winston-Salem; James S. Wilson, Durham; Creighton Wrenn, Mooresville.

American College of Radiology

Dr. Bernard W. Robinson, of the Department of Radiology, Providence Hospital, Chicago, made a study of 302 cases of cancer in the Negro and found that malignancy behaves about the same in all races under comparable situations and in similar environments.

He reported his study in the November issue of the **American Journal of Roentgenology and Radium Therapy**, which is published primarily for physicians who specialize in x-ray diagnosis and treatment.

"One fact which impresses itself," he continued, "is the marked predominance of malignancy in the Negro female in comparison to the male. Not only does breast pathology and pathology of the female reproductive system take up over 60 per cent of this series, but also female malignancy plays a large part in gastrointestinal cancer and in the 28 miscellaneous cases of which 17 were women.

AMERICAN TRUDEAU SOCIETY

The American Trudeau Society, Medical Section of the National Tuberculosis Association, has issued an invitation to physicians to submit papers for presentation at the annual meeting in Boston, May 26-30, 1952.

The abstracts or complete papers must be on scientific or clinical subjects relative to tuberculosis or non-tuberculous respiratory and cardiac diseases, and should be limited to 300 words. The ATS Subcommittee on Medical Sessions, Annual Meeting Program Committee will review the papers and select the most interesting material for possible inclusion on the program.

All papers submitted must reach Dr. Theodore L. Badger, Chairman, Medical Sessions Subcommittee, American Trudeau Society, 1790 Broadway, New York 19, New York, not later than January 1.

DEPARTMENT OF THE ARMY

Army Medical Service Using Improved Insecticides To Combat DDT-Resistant Korean Lice

The Army Medical Service, in cooperation with the U. S. Department of Agriculture, has developed and is now using in Korea new insecticidal formulations capable of controlling Korean body lice which are resistant to DDT, the Department of the Army has announced.

Use of the new preparations of lindane and pyrethrum louse powder, ensures the continued freedom of United Nations forces from louse-borne epidemic typhus which could be introduced by infested North Korean and Chinese prisoners of war. Both substances are highly effective against the Korean louse and have been tested and declared safe for human use by the Army Environmental Health Laboratory, Edgewood, Maryland.

DDT is still highly effective against lice and other insects in this country and, as far as is known, most other areas of the world. Both lindane and pyrethrum powder actually are less potent than DDT against lice in the United States.

* * *

Army-Navy Medical Team Cuts POW's Dysentery Rate Sharply

The alarmingly high rate of dysentery among Chinese and North Korean prisoners of war in Korea has been reduced 75 per cent by a team of Army, Navy, and civilian medical experts as the first step in a continuing program to curb dysentery throughout Korea, the Department of Defense has announced.

VETERANS ADMINISTRATION

John D. Alderman, at present personnel officer of the VA Hospital at Oteen, North Carolina, has been appointed assistant manager of the VA hospital at Lake City, Florida.

Mr. Alderman first entered the employ of VA in December, 1945, as chief of the classification division in the former Atlanta, Georgia, branch office. He has held three other responsible positions in VA since then.

* * *

A physician who headed the paraplegic service at the Veterans Administration hospital in Richmond, Virginia, and was himself a paralysis victim, was recently memorialized with the establishment of a research fund for paraplegia by his former patients, doctors and nurses. The physician was Dr. William Warren Sager, who died at his post in September, 1951, after having served as chief of the cord injury service at the Richmond hospital since November, 1949. During the entire period, he was confined to a wheelchair.

The fund, to be used in furthering research in the field of spinal paralysis, will be administered by the National Paraplegia Foundation. The initial contribution to the fund was made by the Virginia Chapter of Paralyzed Veterans of America, members of which are former or present patients of the Richmond hospital.

* * *

Veterans Administration has announced that it is trying to solve the problem of providing hospitalization and outpatient treatment for several thousand veterans with mental illnesses who might qualify for such care under a new law.

The new law (Public Law 239, enacted October 30, 1951) provides that for the purpose of VA hospital and medical care, including outpatient treatment, World War II veterans and those with service since June 27, 1950, who develop an active psychosis within two years from the date of separation from active service shall be deemed to have incurred the disability in active service.

VA is now faced with the task of reviewing the cases of approximately 9,000 World War II veterans awaiting hospitalization who have psychosis classified as nonservice-connected. Those found eligible will be reclassified as service-connected which gives them a priority for hospitalization and makes them eligible for outpatient treatment.

Those now on waiting lists for hospitalization need not file new applications as their cases will be automatically reviewed.

FEDERAL SECURITY AGENCY

Public Health Service

The Public Health Service, Federal Security Agency, recently announced publication of **Environment and Health**, the first book in the Service's 153 year history dealing comprehensively with environmental health.

A limited edition of **Environment and Health** has been published for distribution to health departments, sanitary engineers, schools of public health, and other professional audiences. The book is intended to serve both as a review of environmental health of the times and as a textbook for students of public health. Copies are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 75 cents each.

* * *

Vital statistics now available reveal that deaths from heart disease and cancer among children of school age exceed in number deaths from all infections and parasitic diseases combined, it was announced by the Federal Security Agency.

The announcement is based on a study by the National Heart Institute of the National Institutes of Health, Public Health Service, of population mortality figures compiled by the National Office of Vital Statistics.

In 1948, the latest year for which complete figures are available, the study revealed cardiovascular disease and cancer deaths—with rheumatic heart disease and leukemia the leading causes—totaled 4,514 in the 5 to 19 age group. In compar-

ison, the infectious and parasitic diseases—with tuberculosis the chief cause of death—accounted for 3,990 deaths in the same age group.

"It should be emphasized that the comparison is only relative," Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, pointed out. "Actually, there has been an over-all decline in the number of all deaths from diseases in childhood, including those due to both heart disease and cancer. But the decline in the infectious and parasitic diseases has been overwhelmingly greater. This can be attributed for the most part to the antibiotics and improved measures for detecting and preventing these diseases."

The report shows that the death rate from infectious and parasitic diseases in the 5 to 19 age group dropped from 48.2 per 100,000 in 1933 to 11.5 per 100,000 in 1948. During the same period heart and cancer deaths in the group dropped from 19.8 to 13.0 per 100,000 persons. Accidents, however, continue as the leading cause for all deaths in the age group, totaling 11,348 in 1948, or a rate of 32.8 per 100,000 children.

B-D Introduces Sheer Full-Footed Elastic Hosiery

Full-footed, sheer, form-fitted ACE Elastic Hosiery, knit of nylon-covered rubber thread, has been introduced by Becton, Dickinson and Company, of Rutherford, New Jersey.

The full foot in ACE Elastic Hosiery insures positive anchorage at the toe, and provides a radically new, improved type of "suspension support" to structures of the leg. Since the hosiery has a "two-way" stretch, it does not have to rely solely on pressure around the circumference of the leg for support, and can be knit of lighter weight thread, making it cooler and more comfortable.

ACE Elastic Hosiery overcomes many patients' objection to supportive hose in that it is not necessary to wear overhose. This eliminates the unattractive bulkiness and unsightly wrinkles which in the past have made it obvious that the patient was wearing elastic hosiery. ACE Elastic Hosiery is offered in a neutral shade of beige and is hardly discernible from service weight nylons on the leg. Women will not object to wearing the new hosiery anywhere—at the office, on the street, or even to the theater.

Becton-Dickinson has developed a "Calcufit" simplified method of fitting ACE Elastic Hosiery, and physicians are supplied with special charts for the rapid determination of the size hose required for any patient.

Dr. John Mote Named Medical Director at Smith, Kline & French Laboratories

Dr. John R. Mote, noted research scientist responsible for much of the clinical development of ACTH, has joined the Research & Development Laboratories of Smith, Kline & French Laboratories as medical director.

Formerly medical director and assistant general manager of Armour Laboratories, Chicago, Dr. Mote will assume his new post with the Philadelphia pharmaceutical research and manufacturing firm in September.

In his active medical career, Dr. Mote has participated in medical research and medical instruction, as well as serving during World War II, first with the American Red Cross and then in the Navy.

After the war, Dr. Mote joined Armour Laboratories, and as medical director supervised the clinical work made on the newly discovered endocrine agent, ACTH. He became assistant general manager of that firm last year.

New Method Found to Combat "Diaper Rash"

Ammonia fights ammonia in a new method found by physicians here to combat "diaper rash."

Developed by Doctors William Pfeffer, Jr., and Clement A. Smith, Children's Medical Center, Boston Lying-In Hospital, the method involves rinsing the diapers in a quaternary ammonia compound that inhibits the urea-splitting organisms, particularly bacterium ammoniagenes, commonest cause of the erythema ammoniacal dermatitis, medical name for "diaper rash."

The two physicians have reported on their findings in the **Journal of Pediatrics.** Diapers were washed and rinsed as usual, using a synthetic detergent instead of soap. After washing and immediately before drying, the diapers were given a final rinse in 1:5000 Roccal dilution (1 teaspoonful of 10 per cent Roccal to 2 quarts of tap water), wrung out, and hung up to dry. Diapers prepared in this way were indistinguishable in color, softness, and odor from diapers prepared without Roccal.

Roccal is a quaternary ammonia compound developed in the laboratories of Winthrop-Stearns, Inc. It is available in retail drug stores. An efficient well tolerated dilution for rinsing diapers is one teaspoonful of Zephiran Concentrate in 2 quarts of tap water.

Schenley Labs Send Officials on Survey Abroad

Seven executives of Schenley Laboratories, Inc., headed by Arthur C. Emelin, president of the Schenley Industries, Inc., affiliate, have departed for a thirty day investigation of current operations by pharmaceutical companies in three European countries. The purpose of the trip, according to Emelin, is to assist pharmaceutical associates abroad—particularly in the production of antibiotics—and to study recent progress in pharmaceutical research and manufacturing.

The party will proceed directly to Ludwigshaven, Germany, for roundtable conferences with executives of Badische Anilin and Soda Fabrik, and will visit the Bayer Company at Leverkusen, Germany, for similar conferences.

Afterwards, the party will fly to Paris, France, where the Sofrapen Company has operated since July, 1948, a penicillin production plant designed by Schenley.

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BOOK REVIEWS

Preventive Medicine and Hygiene (Originally by Milton J. Rosenau, M.D.) Ed. 7. By Kenneth F. Maxcy, M.D., Professor of Epidemiology, the Johns Hopkins University School of Hygiene and Public Health. 1,462 pages. Price, $14.00. New York: Appleton-Century-Crofts, Inc., 1951.

Students and practitioners of medicine and public health will welcome this long awaited revision of Rosenau's **Preventive Medicine and Hygiene.** The period of 16 years separating the publication of the sixth and this new seventh edition has been characterized by a very rapid expansion in our knowledge and experience in the fields of preventive medicine and public health; scope has broadened and emphasis in many areas has changed markedly. In the light of these advances the new author of this text, Dr. Kenneth F. Maxcy, and his 26 collaborators have done a particularly creditable job of reorganization and rewriting. New information, new concepts, and up-to-date authoritative opinion on a wide range of subject matter that is often not readily available, is expertly condensed in this new volume.

This text contains major sections dealing with the prevention of communicable diseases, nutrition and deficiency diseases, maintenance of health and prevention of disability, food sanitation, environmental medicine, industrial hygiene and diseases of occupation, sanitary control of water supplies, sewage and refuse disposal, methodology, public health organization and activities. Increased attention is given to the prevention of noninfectious disease, to the maintenance and promotion of health of the middle and older age groups, and to community health resources. In the reviewer's opinion, the only major omission in this new edition is a section dealing with hereditary factors in disease and the increasingly important preventive and control measures based on modern genetic concepts and proven experience.

This new revision of Rosenau is highly recommended. Dr. Maxcy has proven himself a worthy successor to the authorship of a textbook that has always maintained the highest of quality and respect in its field.

Technical Methods for the Technician. By Anson L. Brown, M.D. Ed. 4. 784 pages. Price, $10.00. Columbus, Ohio: Printed and published by the author, 1950-51.

This is an amazing, amusing, and confusing book. The author operates a large pathological laboratory in Columbus, Ohio, and the work is an outgrowth of material presented to technical students in his establishment. Its various sections outline laboratory apparatus and procedures of all kinds, and are profusely illustrated by drawings and reproductions of photographs. Since the quality of the information thus imparted is very uneven, the book will be of little use to those for whom it is intended—beginning technical students. For example, the reader is informed that pus cells in the urine are always round (which they are not), and that they may be reported as "occasional, few, many, and millions." This latter term is usually used in laboratories as an expletive rather than an adjective, and in the interest of good usage is best left so.

Many of the sections are preceded by quotations, usually from the author, which run the gamut of platitudes, homilies and nonsequiturs. We are told that: "Laboratory tests are aids to diagnosis"; "The white count is a symptom of a disease, and it must be borne out by clinical findings"; "A blood test is a symptom of a disease—does it bear out the clinical findings?" From this, properly interpreted, we find that Dr. Brown considers a person who orders a blood count to be suffering from a disease.

This book cannot be recommended to anyone but a former associate of Dr. Brown's, to whom it would serve as a memento.

A Textbook of Pathology. Pathologic Anatomy in Relation to the Causes, Pathogenesis, and Clinical Manifestations of Disease. By Robert Allan Moore, M.D., Edward Mallinckrodt, Professor of Pathology, Washington University School of Medicine. 1048 pages, with 501 illustrations. Price, $12.50. Philadelphia: W. B. Saunders Company, 1951.

The first edition of this book, published in 1945, was given a most complimentary reception by pathologists in general, and by many clinicians. In some respects, it offered a departure from the usual textbook in this field, in that many of the degenerative diseases were presented as disturbances in metabolism rather than as distinct anatomic types. This was the author's attempt to emphasize the physiologic and chemical factors in disease. Furthermore, discussions of diseases were arranged according to causation, diseases with similar etiology being grouped together. Where causal agents were unknown or obscure, the disease was discussed in the section dealing with that organ or system.

Several additions, deletions, and substitutions have been made in the current edition, although the general content is closely similar. New chapters on enzymes and diseases of the aged are included. Some chapters have been rearranged for better correlation or for the incorporation of new information. These are only a few examples of the improvements which have been made to bring the text up to date.

In general, the bibliography includes many references to recent significant investigations. The author's classification of references in each chapter facilitates the task of those who wish to examine the original publications on a certain subject. Most of the illustrative material is well chosen, but many of the reproductions could be improved in an effort to make them more helpful to the student. The new, double-column format is attractive, and, in this reviewer's opinion, facilitates reading.

This reviewer, having been a member of Dr. Moore's staff for several years, is somewhat favorably prejudiced perhaps. However, being as objective as possible, any observer would conclude that this book represents an outstanding contribution in this academic discipline. The sections on clinicopathologic correlation are noteworthy, and increase the value of the context to the medical student, as well as to those who will use the book, only on occasion, as a source of reference. The amount of useful, accurate information contained within the relatively short space of 1,022 printed pages is truly impressive.

Color Atlas of Morphologic Hematology. By Geneva A. Daland. Edited by Thomas H. Ham, M.D. Illustrations by Etta Piotti. 74 pages. Price, $5.00. Cambridge, Massachusetts: Harvard University Press, 1951.

This volume, prepared by Miss Daland, who is chief laboratory technician in hematology at the Thorndike Memorial Laboratory in Boston, is intended to serve as a companion piece to Dr. Ham's syllabus of laboratory examinations, also published

by the Harvard University Press. As stated on the fly leaf, it furnishes a guide for reference in the study of peripheral blood films stained with Wright's stain. The coverage of various diseases of the hemopoietic system is adequate, and the quality of the reproductions is excellent.

Most medical students and physicians not primarily concerned with hematology feel the need of a blood cell atlas of some sort as an aid to their interpretation of blood films, and this volume, which is inexpensive as far as such a handsome work is concerned, should satisfy their wants. The users of such atlases should not expect that any book will solve problems that only experience can resolve, and this book is no exception. There is always a hiatus between the "picture in the book" and the cell that one puzzles over at the moment, and drawings in general always leave the reader a little suspicious that the artist has put in something that is not there. Unlike many atlases, in which the cells illustrated are stained with little-used materials, this one sticks to Wright's stain and thus is more "believable"; and the quality of the illustrations is such as to inspire confidence.

The accompanying text is modest in scope and avoids controversy, in so far as that is possible. Although this reviewer would take exception to some of the terms and concepts, in general they are in keeping with current ideas. The book is recommended to anyone seeking an atlas, but the user must keep in mind that it is intended as an adjunct to other texts and not as a text in itself.

Outline of Fundamental Pharmacology. By David Fielding Marsh, Professor and Head of the Department of Pharmacology, West Virginia University School of Medicine, Morgantown, West Virginia. 242 pages, with 19 illustrations. Price, $6.00. Springfield, Illinois: Charles C. Thomas, 1951.

The fundamental purpose of this book is to explain to non-pharmacologists the viewpoint and principles of research used by the pharmacologist. For those unacquainted with the methods and problems of drug investigation such as medical students, chemistry students, and graduates in these fields, it provides an easy and comprehensive introduction to the subject of pharmacology. For those in related fields of investigation such as physiology, bacteriology, and, particularly, clinical medicine, it might be considered a "readers' guide to pharmacology." While the book contains extensive references to the basic books and papers which form the reference library of a pharmacologist, no attempt has been made to provide a complete bibliography on the topics covered.

The book as a whole might be regarded as the plea of a pharmacologist to other research workers to make more use of the fundamental methods of pharmacology. Particular emphasis is placed on the statistical handling of data and on the preconsideration of statistics in the planning of experiments. Biologic variation, variation in the response to drugs, and the pharmacologist's method of handling these variations in bioassay and biocomparison are well presented and well illustrated with data from the author's work. Other sections present discussions of localization of action sites of drugs, the mechanics and dynamics of absorption and distribution, the fate of drugs, including their biotransformation and excretion, the mechanism of the action of drugs, and, finally, the relationship of chemical structure and biologic activity. In each section an attempt is made to discuss the pertinent problems rather than the actual techniques involved in their solution.

Criticisms of the book which could be raised, deal principally with the omission of seemingly pertinent topics and with apparent imbalances in the treatment of certain subjects. For example, the problems involved in the finer localization of the sites of action of drugs in terms of enzymes are inadequately treated, while the problems concerned in the renal excretion of drugs are scarcely mentioned. More specifically, the problems of enteric medication are omitted from the discussion of the oral route of administration. On the all important topic of the relationship of chemical structure and activity or biochemorphology, 30 pages are devoted to a compilation of the effects of even the rarest of elements such as inorganic ions, while the wide field of the effect of changes in the structure of organic compounds is treated in only eight pages. This treatment does not appear to be in keeping with the relative importance of these two subjects in pharmacology. An extensive listing of definitions related to pharmacy in one chapter also seems out of place in a book of this type.

As a whole this book should impress favorably those little acquainted with pharmacology. It may also appeal to researchers in allied fields, especially if they cross the borders of the wide field of investigation concerning the biologic action of chemical substances.

Handbook of Nutrition. Prepared under the Auspices of the Council on Foods and Nutrition of the American Medical Association. Ed. 2. 715 pages. Price, $3.75. Philadelphia: The Blakiston Company, 1951.

The **Handbook of Nutrition** is a symposium by leading authorities in the field of nutrition, prepared under the auspices of the Council on Foods and Nutrition of the American Medical Association.

The book is divided into four general sections. The first, on "Individual Nutrients," deals with a general consideration of the principle groups of food stuffs, minerals and vitamins. Section two is a discussion of "Nutritional Needs" in health and under conditions of physiologic stress and disease. Section three discusses "Nutritional Deficiencies," with a discussion of the clinical syndromes, accessory clinical findings, and the physiologic basis for treatment, including dietary interrelationship, caloric requirements, fluid therapy, and the management of vitamin and mineral deficiencies. Section four takes up "Foods of Plant and Animal Origin," and their nutritional qualities.

The material has been critically evaluated and presented in a factual, readable fashion, lending itself readily to interpretation and direct clinical utilization. An excellent and comprehensive bibliography is provided.

The handbook is recommended to all students and practitioners of medicine.

Armour to Stage International Symposium On Chemistry of ACTH

Armour and Company will sponsor an international symposium in the Palmer House in Chicago September 18 at which leading European and American biochemists will discuss the chemistry of ACTH.

The conference will follow within a few days the Jubilee meeting celebrating the seventy-fifth birthday of the American Chemical Society, together with the meetings of the International Chemical Congress and the International Chemical Union, in New York and Washington.

Many prominent foreign chemists will be in the United States for these sessions, most of them as guests of American chemical and pharmaceutical organizations.

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KEY TO ABBREVIATIONS

Aux—Auxiliary
C—Correspondence
C&O—Committees and Organizations
CPC—Clinicopathologic Conference
PM—President's Message
TS—Thumbnail Sketches of Eminent Physicians

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